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WATER POLLUTION SURVEILLANCE SYSTEM. VOLUME 2. NORTH ATLANTIC BASIN

Public Health Service
Washington, D. C.

30 September 1963

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NORTH ATLANTIC BASIN

volume 2

PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA

October 1, 1962 • September 30, 1963

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE • Public Health Service

NORTH ATLANTIC BASIN

Volume 2

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Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA

October 1, 1962 - - - September 30, 1963

A Federal, State and Local cooperative report on water pollution surveillance of surface waters at selected locations throughout the United States

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Division of Water Supply and Pollution Control
Washington, D.C. 20201

RELATED PUBLICATIONS:

National Water Quality Network
Annual Compilation of Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663 (1958 Edition)

National Water Quality Network
Statistical Summary of Selected Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663—Supplement 1

National Water Quality Network
Annual Compilation of Data, October 1, 1958–September 30, 1959
Public Health Service Publication No. 663 (1959 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1959–September 30, 1960
Public Health Service Publication No. 663 (1960 Edition)

National Water Quality Network
Plankton Population Dynamics, July 1, 1959–June 30, 1961
Public Health Service Publication No. 663—Supplement 2

National Water Quality Network
Annual Compilation of Data, October 1, 1960–September 30, 1961
Public Health Service Publication No. 663 (1961 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1961–September 30, 1962
Public Health Service Publication No. 663 (1962 Edition)

ACKNOWLEDGMENT

To increase the usefulness of the water quality data, annual compilations since 1958, including this one, have presented preliminary and unadjusted flow data for gaging stations at or near most of the Public Health Service Water Pollution Surveillance System sampling points. Final data may be obtained directly from the agency concerned. Any studies using the provisional flow data herein compiled should verify the data prior to completion of reports on such studies. For making the flow information available for this publication, grateful acknowledgment is made by the Public Health Service to:

The International Boundary and Water Commission,
United States and Mexico

The International Joint Commission, United States and Canada

The U.S. Department of the Interior
Bureau of Reclamation • Geological Survey

The U.S. Department of the Army
Corps of Engineers • Lake Survey

FOREWORD

This is the sixth annual compilation of data from the Public Health Service Water Pollution Surveillance System (formerly the National Water Quality Network). During this year, the System was increased from 122 to 128 stations. In order to provide data in a form more useful for local or regional water pollution control officials and their staffs, the present compilation is published in 11 separate volumes. The surveillance data reported herein reveal additional findings on pesticides and other organic chemicals in surface waters and on trends in radioactivity and other areas.

The Public Health Service gratefully acknowledges the assistance to our Surveillance System of the participating local, State and Federal Government agencies and private industry. The success of this program depends, in a large measure, upon their continued interest and support.

GORDON E. MCCALLUM, D. Sc.,
Assistant Surgeon General,
Chief, Division of Water Supply and Pollution Control

VOLUME 1

Northeast Basin

CONNECTICUT RIVER
at Enfield Dam, Conn.
below Northfield, Mass.
at Wilder, Vt.

HUDSON RIVER
below Poughkeepsie, N.Y.

LAKE ERIE
at Buffalo, N.Y.

MERRIMACK RIVER
above Lowell, Mass.

RARITAN RIVER
at Perth Amboy, N.J.

ST. LAWRENCE RIVER
at Massena, N.Y.

VOLUME 2

North Atlantic Basin

DELAWARE RIVER
at Philadelphia, Pa.
at Trenton, N.J.
at Martins Creek, Pa.

POTOMAC RIVER
at Washington, D.C.
at Great Falls, Md.
at Williamsport, Md.

SCHUYLKILL RIVER
at Philadelphia, Pa.

SHENANDOAH RIVER
at Berryville, Va.

SUSQUEHANNA RIVER
at Conowingo, Md.
at Sayre, Pa.

VOLUME 3

Southeast Basin

APALACHICOLA RIVER
at Chattahoochee, Fla.

CHATTAHOOCHEE RIVER
at Columbus, Ga.
at Lanett, Ala.
at Atlanta, Ga.

ESCAMBIA RIVER
at Century, Fla.

ROANOKE RIVER
at John H. Kerr Dam and
Reservoir, Va.

SAVANNAH RIVER
at Port Wentworth, Ga.
at North Augusta, S.C.

TOMBIGBEE RIVER
below Columbus, Miss.

VOLUME 4

Western Great Lakes and Lake Erie Basins

WESTERN GREAT LAKES

DETROIT RIVER
at Detroit, Mich.

LAKE MICHIGAN
at Gary, Ind.
at Milwaukee, Wis.

LAKE SUPERIOR
at Duluth, Minn.

ST. CLAIR RIVER
at Port Huron, Mich.

ST. MARYS RIVER
at Sault Ste. Marie, Mich.

LAKE ERIE BASIN

CUYAHOGA RIVER
at Cleveland, Ohio

MAUMEE RIVER
at Toledo, Ohio

VOLUME 5

Ohio and Tennessee River Basins

OHIO RIVER BASIN

ALLEGHENY RIVER
at Pittsburgh, Pa.

CUMBERLAND RIVER
at Clarksville, Tenn.

KANAWHA RIVER
at Winfield Dam, W. Va.

LITTLE MIAMI RIVER
at Cincinnati, Ohio

MONONGAHELA RIVER
at Pittsburgh, Pa.

OHIO RIVER
at Cairo, Ill.
at Evansville, Ind.
at Louisville, Ky.
at Cincinnati, Ohio
at Huntington, W. Va.
below Addison, Ohio
at Toronto, Ohio

WABASH RIVER
at New Harmony, Ind.

TENNESSEE RIVER BASIN

CLINCH RIVER
above Kingston, Tenn.
at Clinton, Tenn.

TENNESSEE RIVER
at Pickwick Landing, Tenn.
at Bridgeport, Ala.
at Chattanooga, Tenn.
at Lenoir City, Tenn.

VOLUME 6

Upper Mississippi River Basin

ILLINOIS RIVER
near Grafton, Ill.
at Peoria, Ill.

MISSISSIPPI RIVER
at Cape Girardeau, Mo.
at East St. Louis, Ill.
at Burlington, Iowa
at Dubuque, Iowa
at Lock and Dam 3 below St. Paul, Minn.

RAINY RIVER
at Baudette, Minn.
at International Falls, Minn.

RED RIVER (NORTH)
at Grand Forks, N. Dak.

VOLUME 7

Missouri River Basin

BIG HORN RIVER
at Hardin, Mont.

BIG SIOUX RIVER
below Sioux Falls, S. Dak.

KANSAS RIVER
at DeSoto, Kans.

MISSOURI RIVER
at St. Louis, Mo.
at Missouri City, Mo.
at Kansas City, Kans.
at St. Joseph, Mo.
at Omaha, Nebr.
at Yankton, S. Dak.
at Bismarck, N. Dak.
at Williston, N. Dak.

NORTH PLATTE RIVER
above Henry, Nebr.

PLATTE RIVER
above Plattsmouth, Nebr.

SOUTH PLATTE RIVER
at Julesburg, Colo.

YELLOWSTONE RIVER
near Sidney, Mont.

VOLUME 8

Southwest-Lower Mississippi River Basin

ARKANSAS RIVER
at Pendleton Ferry, Ark.
at Little Rock, Ark.
near Forth Smith, Ark.
near Ponca City, Okla.
at Coolidge, Kans.

MISSISSIPPI RIVER
at New Orleans, La.
at Delta, La.
at Vicksburg, Miss.
at West Memphis, Ark.

OUACHITA RIVER
at Bastrop, La.

RED RIVER (SOUTH)
at Alexandria, La.
at Bossier City, La.
at Index, Ark.
at Denison, Tex.

VERDIGRIS RIVER
at Nowata, Okla.

VOLUME 9

Colorado River and Western Gulf Basins

COLORADO RIVER BASIN

ANIMAS RIVER
at Cedar Hill, N. Mex.

COLORADO RIVER
at Yuma, Ariz.
above Parker Dam, Ariz.-Calif.
near Boulder City, Nev.
at Page, Ariz.
at Loma, Colo.

GREEN RIVER
at Dutch John, Utah

SAN JUAN RIVER
at Shiprock, New Mex.

WESTERN GULF BASIN

RIO GRANDE
at Brownsville, Tex.
at Laredo, Tex.
at El Paso, Tex.
below Alamosa, Colo.

SABINE RIVER
near Ruliff, Tex.

VOLUME 10

Pacific Northwest and Alaska Basins

PACIFIC NORTHWEST

CLEARWATER RIVER
at Lewiston, Idaho

COLUMBIA RIVER
at Clatskanie, Oreg.
at Bonneville, Oreg.
at McNary Dam, Oreg.
at Pasco, Wash.
at Wenatchee, Wash.
at Northport, Wash.

PEND OREILLE RIVER
at Albeni Falls Dam, Idaho

SNAKE RIVER
at Ice Harbor Dam, Wash.
at Wawawai, Wash.
at Payette, Idaho

SPOKANE RIVER
at Post Falls Dam, Idaho

WILLAMETTE RIVER
at Portland, Oreg.

YAKIMA RIVER
at Richland, Wash.

ALASKA BASIN

CHENA RIVER
at Fairbanks, Alaska

SHIP CREEK
at Anchorage, Alaska

VOLUME 11
California and the Great Basins

CALIFORNIA BASIN

KLAMATH RIVER
near Keno, Oreg.

SACRAMENTO RIVER
at Greens Landing above Courtland, Calif.

SAN JOAQUIN RIVER
near Vernalis, Calif.

GREAT BASIN

BEAR RIVER
above Preston, Idaho

TRUCKEE RIVER
at Calif.-Nev. Border
at Farad, Calif.

CONTENTS

	Page
FOREWORD	iii
ACKNOWLEDGMENT	iii
PUBLIC HEALTH SERVICE WATER POLLUTION SURVEILLANCE SYSTEM	1
MAP OF SYSTEM SAMPLING STATIONS	2
ANALYTICAL METHODS AND RELIABILITY OF DATA	4
WATER POLLUTION PARAMETERS	5
Radioactivity	5
Plankton Populations	6
Organic Chemicals	7
Chemical, Physical, and Bacteriological Examinations	10
Trace Elements and Other Determinations	11
The Benthos	12
Fish Populations	13
STREAM FLOW	14
BIBLIOGRAPHY	15
EXPLANATION OF ANALYTICAL DATA	17
BASIN DESCRIPTION (North Atlantic)	23
MAP OF BASIN SAMPLING STATIONS (North Atlantic)	23
ANALYTICAL AND FLOW DATA. (*See* Station Index)	viii

ANALYTICAL AND FLOW DATA INDEX

STATION	General Description Trace Elements, Strontium 90	Radioactivity Determinations	Plankton Populations	Organic Chemicals	Chemical, Physical and Bacteriological Analyses	Flow Data
	Page No.	Page No.	Page No.	Page No.	Page No.	Page No.
Delaware River						
at Philadelphia, Pa	25–26	27	28–29	30	31–32	33
at Trenton, N.J	35–36	37	38–39	40	41	42
at Martins Creek, Pa	43–44	45	46–47	48	49–50	51
Potomac River						
at Washington, D.C	53–54	55	56–57	58	59	60
at Great Falls, Md	61–62	63	64–65	66	67–68	69
at Williamsport, Md	71–72	73	74–75	76	77–78	79
Schuylkill River						
at Philadelphia, Pa	81–82	83	84–85	86	87–88	89
Shenandoah River						
at Berryville, Va	91–92	93	94–95	96	97–98	99
Susquehanna River						
at Conowingo, Md	101–102	103	104–105	106	107–108	109
at Sayre, Pa	111–112	113	114–115	116	117–118	119

THE PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

The Public Health Service program for providing fundamental information on the quality of the Nation's waters stems from Public Law 660, approved July 9, 1956, as amended by Public Law 87-88, July 20, 1961. Section 4(c) thereof states: ". . . the Secretary (of Health, Education, and Welfare) shall in cooperation with other Federal, State, and local agencies having related responsibilities, collect and disseminate basic data on chemical, physical, and biological water quality insofar as such data or other information relate to water pollution and the prevention and control thereof."

To fulfill this responsibility, the Public Health Service Water Pollution Surveillance System collects, interprets, and disseminates:

a. Information on changes in water quality at key points in river systems, as such quality may be affected by changes in water use and development.

b. Continuous information on the nature and extent of pollutants affecting water quality.

c. Data which will be useful in the development of comprehensive water resources programs.

d. Data which will assist State, interstate, and other agencies in their water pollution control programs, and in the selection of sites for legitimate water uses.

Some 50 sampling stations were established when the program started, October 1, 1957. By September 30, 1963, the number had grown to 128.

Each sampling location satisfies one or more of the following criteria:

a. Major waterways used for public water supply, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

b. Interstate, coastal, and international boundary waters.

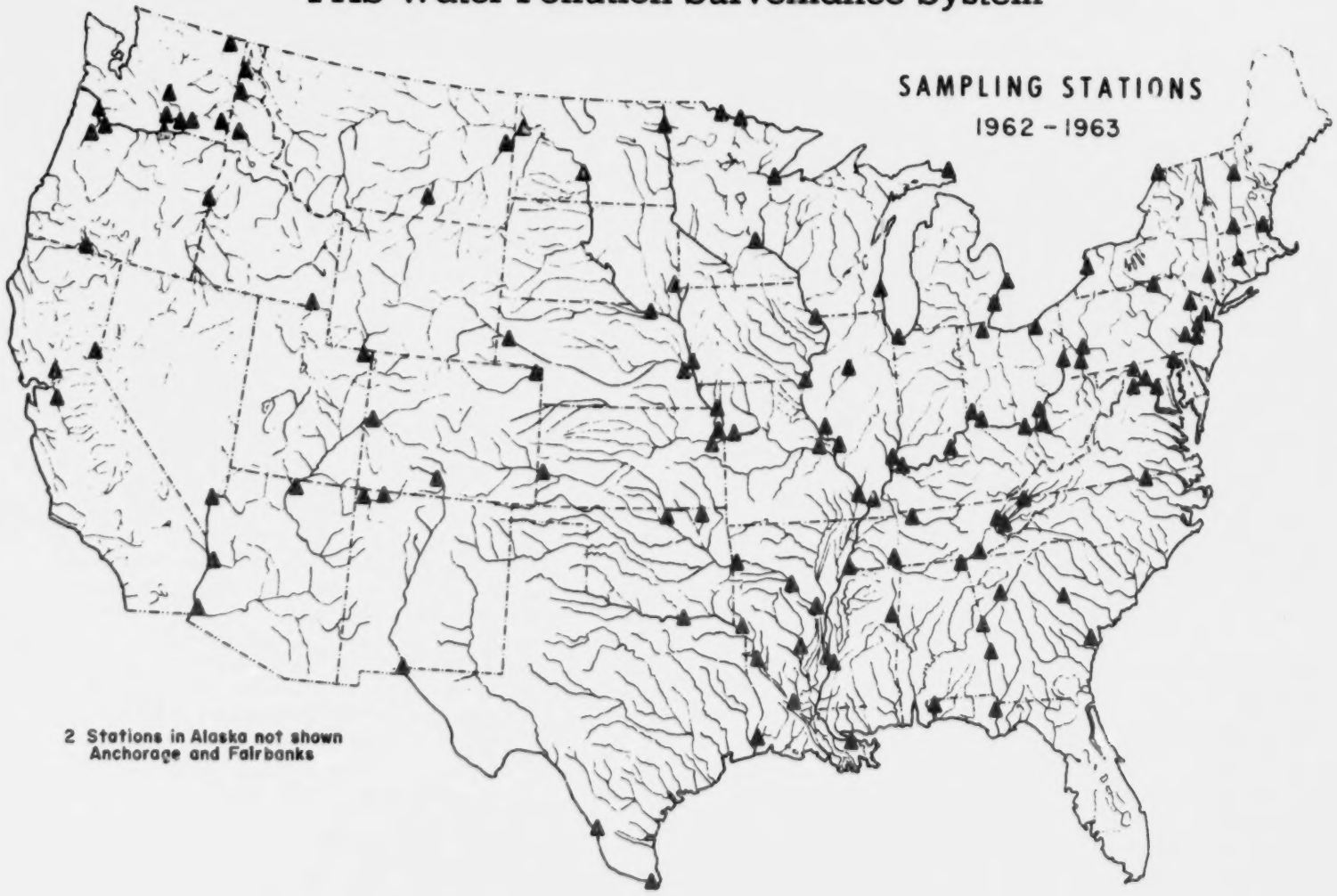
c. Waters on which activities of the Federal Government may have an impact.

Sampling station sites are fixed only after consultation with local, State, Federal and other agencies having related interests.

Active local participation is important in this operation. It assures maximum development of all information valuable both locally and nationally. Program costs are shared by the Federal Government and State and local agencies, those of the latter through contributions of laboratory and sampling manpower. Specifically, the State and local agencies perform certain of the conventional chemical analyses and collect samples for the newer, more complex examinations. The Public Health Service, in turn, performs the more complex determinations and makes the results available to the participants and to the public. In addition, the consultation, training facilities, and other resources of the Public Health Service are available to the cooperating agencies.

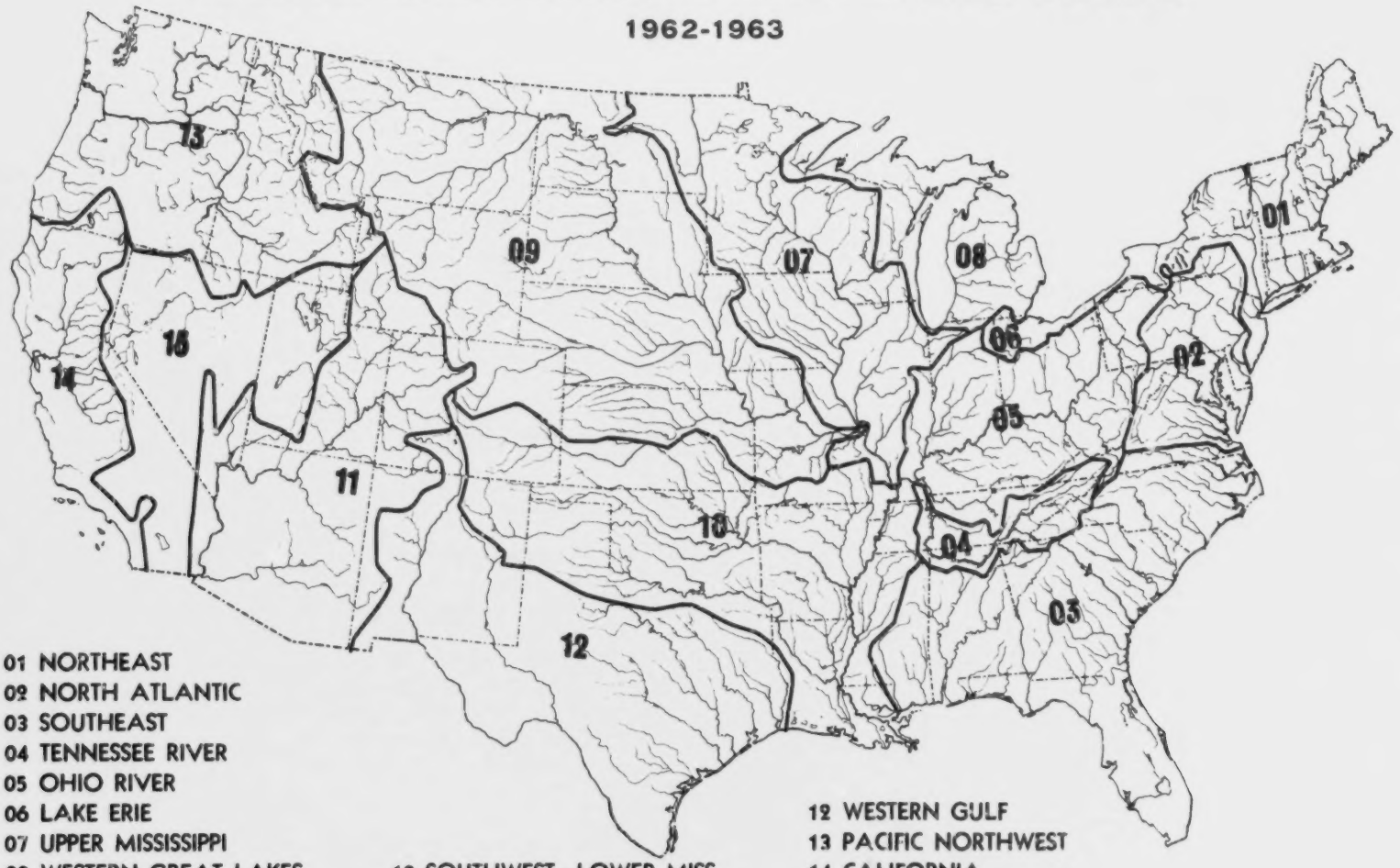
Locations of sampling stations in operation as of September 30, 1963, are shown on page 2. Descriptions of the stations, participating agencies, and other pertinent information are presented with the station data.

PHS Water Pollution Surveillance System



MAJOR RIVER BASINS OF THE UNITED STATES

1962-1963



01 NORTHEAST
02 NORTH ATLANTIC
03 SOUTHEAST
04 TENNESSEE RIVER
05 OHIO RIVER
06 LAKE ERIE
07 UPPER MISSISSIPPI
08 WESTERN GREAT LAKES
09 MISSOURI RIVER
10 SOUTHWEST--LOWER MISS.
11 COLORADO RIVER
12 WESTERN GULF
13 PACIFIC NORTHWEST
14 CALIFORNIA
15 GREAT BASIN

Only after careful screening of needs in water resource development was a pattern set for analyses of water samples.
All System samples are examined for:

a. Radioactivity.
   (1) Gross alpha.
   (2) Gross beta.
   (3) Strontium 90.
b. Plankton populations.
c. Coliform organisms.
d. Organic chemicals.
e. Biochemical, chemical, and physical measurements, including biochemical oxygen demand (BOD), dissolved oxygen (DO), chemical oxygen demand (COD), chlorine demand, ammonia nitrogen, hydrogen ion concentration (pH), color turbidity, temperature, alkalinity, hardness, chloride, sulfate, phosphates and total dissolved solids.
f. Sodium, potassium, fluoride and trace elements.

Samples for groups c and e were collected and analyzed weekly. Samples for organic chemicals were collected and analyzed monthly and plankton organism examinations were conducted semimonthly. Water samples for analysis of suspended and dissolved gross alpha and beta radioactivity were submitted weekly. Strontium 90 analyses were made on composites of weekly samples accumulated over 3-month periods. Sodium, potassium, fluoride, and trace metals were also determined on 3-month composites of weekly samples. New parameters which are developed and found significant will be included as the program continues.

Analytical Methods and Reliability of Data

The physical, chemical and biochemical data documented in this publication are the result of efforts of the cooperating agencies. In general, about half of these measurements were contributed by their laboratories. Specifically, all measurements reported for temperature, pH, DO, BOD, COD, chlorine demand and ammonia nitrogen were performed by the participants at the sample collection point. In addition, about 45 of the participating groups regularly perform all or most of the determinations for the remaining parameters included in the data. Whenever possible, analyses for stable constituents not completed by the participants are completed in the central Water Quality laboratories. While individual laboratories make minor modifications to meet local conditions, the methods used in most cases are those published in the 11th edition, "Standard Methods for the Examination of Water and Wastewater" (22). For uniformity, the chlorine demand test is reported on the basis of the starch-iodide titration procedure, and the chemical oxygen demand test is restricted to the use of 0.025 N reagents.

To assure continued reliability in the published data, frequent analysis of reference samples are made by each cooperating laboratory as an integral part of the overall program. Periodically a synthetic standard sample is provided to each participant for reference analysis. The reported results are reviewed. Any significant errors are called to the attention of the reporting laboratory and, after the cause of the errors has been determined, the previously submitted data are either corrected or discarded. From these findings, the analyses reported in this compilation are believed to be accurate to ± 10 percent of the reported values.

The analytical methods used by the Public Health Service laboratories are described in the discussion of water quality parameters which follows, and are covered by references listed in the Bibliography.

Water Pollution Parameters

In the assessment of water pollution, all of the legitimate purposes for which raw waters can be used, and which may be affected by pollution, must be considered. These may range from the minimum requirements for navigation to the ultimate in water quality demanded for certain industrial processing. Standards differ considerably, therefore, according to water use.

For domestic use, water must be free of disease organisms, clear, colorless, taste- and odor-free, and have a relatively low dissolved mineral content. Agricultural water is judged primarily on its mineral content, especially with respect to the ratio of sodium to other cations, and the presence of boron. Water for fish propogation and recreational purposes must be relatively free from domestic and industrial pollution and must be able to sustain an active flora of the smaller aquatic organisms on which fish and wildlife feed. Industrial water quality demands run the gamut from the complete absence of minerals to a requirement of low temperature, the critical factor in water used for cooling. The effects of radioactive materials on these uses have not yet been fully appraised.

The various laboratory examinations made as part of this program are discussed below.

Radioactivity

Radioactivity, long recognized as a water contaminant from natural sources, has continued to grow in importance and health significance with the development of nuclear energy for both military and peaceful uses. Consequently, levels must be measured continually as new sources are established.

Gross alpha and beta measurements are made on both suspended and dissolved solids in the raw surface water samples. The total radioactivity in the dissolved solids provides a rough measure of the levels which may be found in a treated water, where water treatment removes substantially all of the suspended matter.

Beta activity levels generally reflect the variable contamination resulting from fallout and discharges from nuclear energy installations, institutions utilizing radioactive materials, and other manmade sources. The trend of gross beta radioactivity in samples received from 47 of the Public Health Service Water Pollution Surveillance System stations operating since 1957 is presented in Figure 1. During the first three quarters of the 1962 water year, renewed weapons testing resulted in a rise in gross beta radioactivity in surface waters of the United States. During the sec-

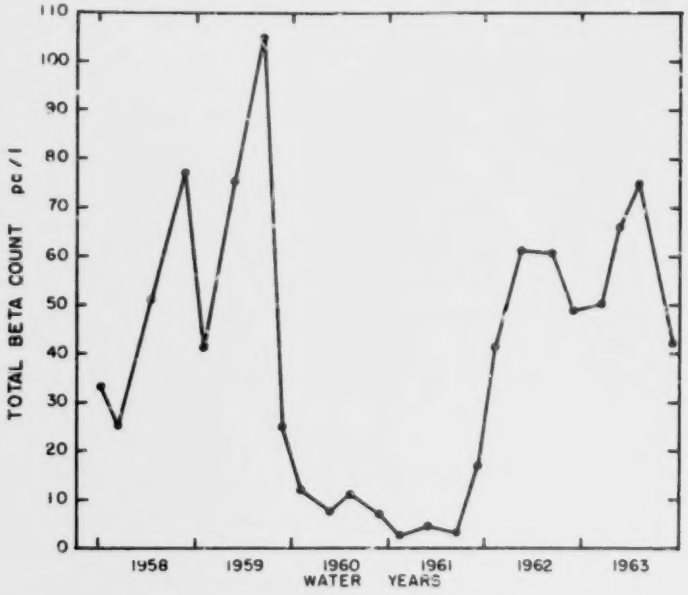


FIGURE 1. GROSS BETA RADIOACTIVITY IN THE SURFACE WATERS OF THE UNITED STATES.

ond and third quarter of water year 1963, the national average activity reached a maximum of 75 pico curies per liter and then decreased. Beta levels have remained well below the Public Health Service Drinking Water Standard of 1,000 pc/l or $\mu\mu c/l$ (26).

Alpha levels reflect largely the activity added by uranium and thorium daughters. The waters of the United States can be characterized in a general way with respect to gross alpha radioactivity content. Gross alpha levels average less than 1 pc/l in east coast, Appalachian, Great Lakes, and Pacific Northwest States. On the Colorado Plateau, and along the eastern slope of the Rocky Mountains, natural radioactivity, principally from mineral deposits, results in average concentrations of about 20 pc/l.

Gross levels are most informative in ascertaining long-term trends or changes in water quality. By themselves, however, they are of limited value in assessing radiation exposure. Where gross results are consistently over the maximum permissible concentrations for mixed fission products, the identity of the specific radionuclides involved must be established.

Because of its significance in the environment, the concentration of strontium 90 in the total solids is also reported. In water year 1963, strontium 90 levels ranged from 0.4 to 11.3 pc/l. The national average reached a high of 3.8 pc/l during the fourth quarter (July, August, September 1963). Highest levels were in the north-central area of the coterminous United States where the average was approximately 6 pc/l for this quarter. All averages were less than the limit (10 pc/l) specified in the Public Health Service Drinking Water Standards (26). The levels of strontium 90 activity in waters of the United States since the first quarter of the 1959 calendar year are presented graphically in figure 2.

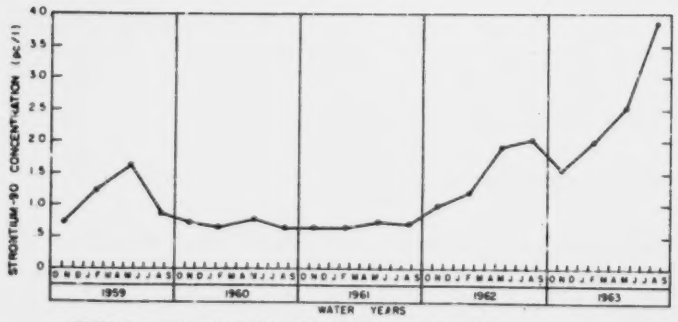


FIGURE 2 STRONTIUM-90 IN SURFACE WATER OF THE UNITED STATES

Plankton Populations

Geographical distribution of algae and other planktonic organisms are influenced by geologic and climatic factors, and result in distinctive plankton populations in different areas. Within each region, population changes are directly related to temperature, and the nature and concentration of organic and mineral substances which enter the aquatic environment. These substances may come from domestic sewage, industrial wastes, runoff from agricultural lands, irrigation discharges, or native rocks and soils. They may be basic nutrients, highly toxic, or metabolically inert. Planktonic organisms differ greatly in their sensitivity to the nutrient and toxic substances which are present. Some thrive only in water which is relatively free of nutrients while others multiply rapidly in water which has been greatly enriched. Large numbers of tolerant algae usually develop in waters containing abundant supplies of inorganic nitrogen and phosphorus resulting from the mineralization of domestic sewage. These nuisance populations may clog filters in municipal water plants, and produce objectional tastes and odors.

On the other hand, plankton populations may be eradicated by the introduction of toxic organic or mineral wastes. This is not desirable because some plankton organisms play essential roles in providing food and oxygen for higher forms of aquatic life, and in cleansing polluted waters.

Beginning at low nutrient levels, progressive enrichment of waters results in an increase in the variety and abundance of the plankton. However, as higher levels of enrichment are attained, the increase in total numbers of organisms is accompanied by a decrease in the number of kinds of organisms. This change is typical in populations which have been subjected to the wide spectrum of substances being introduced into

surface water in ever increasing amounts. Plankton counts, which provide information concerning the variety and abundance of organisms, are useful in detecting changes in the concentration of organic and mineral substances which enter water supplies.

METHODS OF ANALYSIS

Plankton samples are collected semimonthly at each station. A sample consists of 3 liters of raw water taken directly from the stream or from a treatment plant intake. Preservation is effected at the time of collection by the use of 30 ppm merthiolate.

Three types of analyses are performed:

1. Rotifers, crustacea, and other micro invertebrates are removed from a 1-liter aliquot of the sample by settling 24 hours. The sediment is placed in a special slide, 80 x 50 x 2 mm., and the organisms are enumerated under a compound microscope at 100× magnification. The counts are reported as organisms per liter.

2. A "total live algae" count is obtained from 1 milliliter of the sample by scanning two 50-mm. strips on a Sedgwick-Rafter slide using 200× magnification and a Whipple micrometer disc. An appropriate correction factor is used to convert the counts to units per milliliter. Each single cell or natural aggregate of cells (colony) occupying up to 300 square microns (μ^2) is counted as 1 unit. Large colonies are enumerated according to a modified areal-unit method in which aggregates occupying 300–1,000μ^2 are counted as 2 units, those occupying 1,000–2,500μ^2 as 3 units, those 2500–5000μ^2 as 4 units, and those over 5,000μ^2 as 5 units. About 95 percent of cell aggregates fall into size 1 or 2.

3. Identification and proportional census of diatom species are done from sediment obtained by settling 1 liter of the sample 48 hours. A small aliquot of the sediment is placed on a No. 1 coverglass and dried on a warming table. The sediment is ashed on the coverglass by heating on a hotplate, and permanent slides are made with hyrax mounting medium. Counts are made with 90× apochromatic oil immersion objectives and 10× oculars containing a Whipple micrometer disc. Random strip counts are made until the total number of units reaches 200 to 300. The same areal units are used as described for Sedgwick-Rafter counting.

Organic Chemicals

The Nation's water resources continue to receive increasing quantities of organic contaminants. Since 1940 the chemical industry, particularly in the manufacture of synthetic and petrochemicals, has experienced an enormous expansion that shows every sign of continuing. Each year millions of pounds of synthetic detergents, insecticides, herbicides, and similar domestic products find their way into our streams from household sewers, industrial waste discharges, and land runoff.

Effective and economical treatment methods for most of the complex organic materials remain to be developed. Even where treatment exists, residues may remain in sufficient quantity to cause water damage. These stable residues persist through sewage treatment, biological and chemical action of the stream, and water treatment processes, and finally reach the consumer in drinking water.

The presence of some of these materials, even at concentrations considerably less than 1 part per million, may impair water quality, most noticably in production of tastes and odors. Fishflesh tainting, also quickly noticed by the consumer, is another damage. Effects on water treatment, many of which are ill-defined at present, and impairment of water quality for industrial uses are being reported with increasing frequency. Essentially nothing is known of the possible immediate or long-term effects of these materials on human health. Such information is urgently needed.

The usual sanitary analyses are not effective in measuring these newer organic contaminants. Yet it is essential to know something of their concentrations and character. A method known as the "Carbon Adsorption Technique," developed by the Public Health Service, permits the concentration of these organic compounds from a large volume of water. Elution of the adsorbed materials with organic solvents, followed by chemical separation and testing, provides useful information concerning organic pollution and for assaying river systems for these substances.

Following continuous flow of about 5,000 gallons of water through the carbon adsorption column over a 7- to 10-day period at 0.5 gpm, material on the carbon adsorption column is extracted with two solvents, chloroform and alcohol. The residues are weighed. The concentration of these materials in the water sampled is then computed. See Explanation of Analytical Data, page 21.

CHLOROFORM EXTRACTS

The organic residue recovered from the carbon adsorption column by chloroform is very complex. It is desirable to separate the crude extract into certain broad chemical classes, and this can be done on the basis of solubility differences. The various classes or groups and their general significance are discussed briefly below.

Ether Insolubles

This group is usually a brown, humuslike powder, apparently composed to a large extent of carboxylic acids, ketones, and alcohols of complicated structure. Origin of the group, which is an indicator of "old" pollution, is believed to be partially oxidized sewage and industrial wastes. For example, the Ohio River at Cincinnati has been exposed to much industrial and sewage pollution, and hence large amounts of ether insoluble materials are found. Streams with little or no pollution history have little or no ether insolubles. Chloroform extracts contain from 0 to 30 percent of ether insoluble material.

Water Solubles

These substances are largely acidic and undistillable at moderate temperatures, but their solubility in ether indicates that the molecules are smaller and probably simpler than the ether-solubles. On the other hand, their water solubility practically requires the presence of several functional groups, such as hydroxy-acid, keto-acid, and keto-alcohol. Such compounds probably originate from partial oxidation of hydrocarbons or they may be natural substances. They have very little odor. These materials usually make up 10 to 20 percent of the total extract.

Weak Acids

This group is characterized by being removed from ether solution with sodium hydroxide but not with sodium bicarbonate. Phenols are the best known weak acids, and if present in the water, appear in this group. Other weakly acidic compounds include certain enols, imides, sulfonamides, and some sulfur compounds. This group of materials also occurs in nature. The weak acids are odorous, and commonly constitute 5 to 20 percent of the chloroform extract.

Strong Acids

These acids are usually carboxylic acids such as acetic, benzoic, salicylic or butyric. Although classified as strong in reference to carbonic acid, they are actually weak when compared with a mineral acid, such as sulfuric. Many of the compounds are used industrially, but may also be produced by natural processes, such as fermentation. Some of the materials are highly odorous. This fraction makes up from 5 to 20 percent of the total. The significance of the strong acids can be interpreted only in the light of stream pollution conditions.

Bases

These compounds are organic amines. Such materials as aniline and pyridine are amines of commerce. Lower amines may occur as a result of decomposition. Although odorous, the low concentrations found are not likely to cause objectionable conditions. However, in the case of specific amine-containing wastes the compounds can be of considerable significance. Generally, only 1 or 2 percent of the total extract is made up of the bases.

Neutrals

This group frequently constitutes the major portion of the chloroform extract. Neither basic nor acidic, the materials are less reactive and tend to persist in streams longer than many other types. Hydrocarbons, aldehydes, ketones, esters, and ethers are examples of neutral materials. The group lends itself to further fractionation by means of chromatographic separation into aliphatic, aromatic, and oxygenated subgroups:

Aliphatics: This portion represents petroleum type hydrocarbons in a considerable state of purity, and is usually made up of mineral oil type of material. The percentage of aliphatics present yields important information about the possible source of pollution, since petroleum is the most likely source.

Aromatics: These are principally the coal tar hydrocarbons such as benzene, toluene, and a host of others, and their presence in any significant amount is a reliable indication of industrial pollution. Further, the materials can frequently be identified by infrared spectrophotometry. Some aromatic compounds which have been found in our rivers—and in our drinking water—include DDT, aldrin, endrin, dieldrin, phyenyl ether, orthonitrochlorobenzene, pyridine, phenol, and others. The materials are highly odorous, and may also be toxic. Their appearance in any quantity as pollutants should receive careful evaluation.

Oxygenated compounds (Oxys): These are the neutral compounds containing oxygen, such as aldehydes, ketones, and esters. They may have originated by direct discharge or may represent oxidation products from both natural and industrial materials. They help to indicate the "age" of the pollution, since pollution exposed to oxidation forces for a long time would be expected to contain large amounts of oxys. The oxy materials are odorous.

Losses

Manipulative losses inherent in this type of separation may amount to 10 to 15 percent. Losses greater than this may indicate that volatile components were lost from the sample. Such volatiles may have significance as pollutants.

ALCOHOL EXTRACTS

The alcohol extractables generally consist of materials more polar than the chloroform extractables. They often contain synthetic detergents, carboxylic acids and humic materials which may originate naturally or from oxidized products of domestic and industrial wastes. These classes of substances are not quantitatively recovered by the alcohol extraction. For example, this extraction recovers only 20 to 30 percent of the synthetic detergents present. On waters of mixed industrial and domestic pollution, the chloroform and alcohol extractables may be about equal. On some streams where the industrial pollution is rather low and much natural pollution or sewage is present, the alcohol extractables may exceed the chloroform extractables by a factor of 4 to 6

The alcohol extract is usually only partially soluble in water and most ordinary solvents. Very little further chemical separation of this material is currently practical. However, tests have revealed that synthetic detergents may make up 1 to 12 percent of the alcohol extract.

OTHER TESTS

Infrared spectra are routinely run on the total chloroform and alcohol extracts as well as the neutral, aliphatic, aromatic and oxygenated groups which are usually the most significant. Spectra of other groups are obtained when there is an indication that they may be significant. These spectra reveal something of the chemical structure of the materials, indicate differences and in certain instances provide a definite identification. In the case of the alcohol extracts, the infrared spectra will indicate the presence of synthetic detergents if the materials constitute a significant portion.

Thin layer chromatography has been applied successfully to the resolution of the aromatic and basic fractions of CCE. Gas chromatographic equipment with flame ionization, electron-capture and microcoulometric detectors have also been used freely in the identification of specific substances.

COMPOSITE ANALYSIS

Samples from certain locations have been selected for analysis on a quarterly composite basis. Stations that have collected at least 12 samples in a nearly consecutive manner and averaged 100 ppb. or less of chloroform extractables are selected for such analysis when certain other conditions are met. However, samples falling in this category are analyzed individually when the recovery of the chloroform extract is exceptionally high and/or it is unusual in its infrared spectrum or some other physical characteristic.

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SPECIFIC IDENTIFICATIONS

Information about specific organic substances which were identified in carbon adsorption samples is given on the second page of the group associated with each station. The increased number of pesticide and other specific compounds identified, as compared to previous years, is partly associated with greater sensitivity in analytical methodology and may be partly a reflection of the increasing usage of these substances in the total environment.

Chemical, Physical, and Bacteriological Examinations

The various biochemical, chemical, physical, and bacteriological examinations generally performed by the participating laboratories are discussed below.

AMMONIA NITROGEN AND CHLORINE DEMAND

The cost of water treatment for domestic use is affected by the consumption of chlorine, with ammonia nitrogen being responsible for a large portion of the chlorine demand. The greater this demand, the more expensive is the treatment. The ammonia may originate from unstabilized domestic pollution, from industrial waste discharges, from run-off containing fertilizers used in farming operations or from all three. The presence of measurable quantities of nitrogen compounds, not necessarily ammonia, is also an indication of the fertility of the stream toward both macro- and micro-biological forms.

COLOR

Color in domestic water supplies is undesirable. Its removal in the water treatment process, whether it be from natural or industrial sources, may require large doses of chemicals and be expensive.

DISSOLVED OXYGEN, BIOCHEMICAL AND CHEMICAL OXYGEN DEMANDS

Biochemical processes, in which aquatic organisms attack and stabilize the organic matter present, require dissolved oxygen. If unstable oxidizable organic matter is present in excess, the organisms will multiply rapidly, consuming the oxygen present in the water, and bring about a foul, septic stream condition. The dissolved oxygen level thus serves to indicate the biochemical activity of the stream. High activity, resulting in low dissolved oxygen levels, will drive out game fish in favor of scavengers. Very low or zero oxygen levels will kill all fish and aquatic organisms dependent on dissolved oxygen for life. Temperature and reaeration rates also affect dissolved oxygen levels.

The 5-day biochemical oxygen demand (BOD) indicates the degree of unstabilized organic pollution from either domestic or industrial sources, to which the stream is being subjected. A significant demand will affect the fish and macroorganism population, and waters carrying a high BOD seldom contain game fish. On the other hand, game fish will thrive in streams in which the oxygen demand has been stabilized, as this condition is usually favorable for the growth of organisms on which fish feed.

The chemical oxygen demand analysis serves to support the findings of the biochemical oxygen demand test. It too may indicate to what extent the waste load of the stream has been stabilized, or it may indicate the presence of organic and inorganic pollution which is not readily oxidized by biological processes. Because the chemical oxygen demand can be determined quickly in comparison to the biochemical oxygen demand, the establishment of a correlation between the two parameters serves to reduce the number of the latter determinations required. The chemical demand results are nearly always higher than the biochemical demand.

TEMPERATURE

Temperature is particularly important to conservation and industry. A few degrees elevation in temperature due to cooling water discharges may seriously limit the capacity of a stream to support fish life. Also, high water temperatures increase the cost of cooling water for

industrial operations. Cooling towers and other equipment for handling cooling water must be engineered to the temperature levels normally encountered.

MINERAL CONSTITUENTS

These determinations include alkalinity, hydrogen-ion concentration (pH), hardness, chlorides, sulfates, and total dissolved solids. The pH indicates whether water is acidic or alkaline, corrosive or passive. Alkalinity is a measure of the neutralization reserve present, or the extent to which the water can resist a change from an alkaline to an acid condition upon addition of acidic chemicals. This information is important to the water treatment plant operator and to many other water users.

Hardness is not only a measure of the soap consuming property, but is also of importance in the treatment of boiler waters, where removal of hardness is one of the most important functions. Chloride, sulfate, and total dissolved solids add further information on the gross dissolved mineral content carried by the stream. These are of great importance when considering the taste or palatability of water. They are also important when the water is being demineralized for specific industrial processes, since the cost of demineralization is a direct function of the dissolved solids content of the water. In addition, waters of high saline content are less desirable and may at times even be unfit for municipal, irrigation, and other uses.

TURBIDITY

Turbidity of water is due to the suspension of clay, silt, finely divided organic matter, microscopic organisms, and other similar materials. Its presence is of particular importance in water treatment processes and in the propagation of fish and other aquatic life.

COLIFORM ORGANISMS

Information about fecal pollution is essential to water quality measurements. Data on coliform bacteria, used as indicators of pollution, help to point up the trends in the effectiveness of treatment of domestic waste discharges.

The delayed-incubation membrane filter technique is used for the coliform examination, instead of the fermentation tube (MPN) method. The latter necessitates transport of water samples to the Water Quality Section laboratory for examination, with a time lapse between collection and examination that can significantly change their microbial content. Also, some of the many other bacteria present in raw water might overgrow or otherwise inhibit the demonstration of the coliform organisms. In the delayed-incubation membrane filter procedure, the bacteria are filtered out from the fluid samples immediately after collection and the filters sent to the Water Quality Section laboratory on a preservative medium. In the laboratory the membrane filters carrying the bacteria are transferred to a medium selective for coliform organisms, then incubated and counted. The resulting counts approach very closely the actual numbers of coliform bacteria present in the water samples at the time of collection.

Unusual populations of coliform bacteria may mean increased pollution and ensuing loss of water quality. The Public Health Service Water Pollution Surveillance System studies and reports the trends in sewage pollution on streams as indicated by the trends of coliform counts.

Trace Elements and Other Determinations

This year's trace element data differ somewhat from data reported in previous compilations in that the manner of obtaining the data has been modified and the program of elements measured altered. The trace metals measurements are now obtained from a 3.4 meter direct reading spectrograph. Tin, antimony, and bismuth have been discontinued; arsenic, boron, phosphorus, aluminum, and strontium have been added. Increased sensitivity for several elements has been attained, especially zinc, manganese, and beryllium, resulting in fewer indeterminate values.

Twice during the year, 3-month composites of the weekly samples were prepared and subjected to analysis. Examinations covered those elements included in the Public Health Service Drinking Water Standards (*26*), and other metals considered to have possible physiological or

toxicological significance. The ultimate goal of this phase of the program is to provide background data on all elements which may be found in water and which may be of significance in water quality management.

In carrying out the spectrographic examination, the sample is first passed through a membrane filter, .045 micron pore size, to remove all suspended matter. An aliquot of sample is then acidified with redistilled nitric acid and evaporated to a concentration containing 100 mg. of dissolved solids in 5.0 ml. A portion of the prepared sample is placed in a porcelain boat and sparked using a rotating disc, with concentrations of the 19 programed elements measured on the direct reader (*12*).

Waters of low dissolved solids content can be concentrated to a greater degree than those having a high dissolved solids content, thus accounting for the variable sensitivity shown in the tabulations. Values followed by an asterisk (*) show the limits of sensitivity at which the test was performed and indicate that the ion being measured was not detected at that level.

It is known that trace concentrations of some ions are subject to precipitation and adsorption on container surfaces during storage. This applies particularly to iron and manganese which are subject to oxidation. Hence, all the values reported by the spectrographic method represent the quantity of metal in solution at the time of analysis to within about 10 percent.

The measurement of sodium and potassium is performed using a flame procedure. Fluoride is determined with the SPADNS reagent using the method described by Bellack and Schouboe (*3*). Boron, previously measured by the curcumin procedure, is now reported from the spectrograph. Measurement of selenium has been eliminated due to the general absence of this element from the samples examined.

The concentrations of surface active agents, reported as alkyl benzene sulfonate (ABS), in the Nation's surface waters is reported for the first time on a number of selected stations. As the capability of determining this pollutant increases, efforts will be made to include all sampling points in the Surveillance System. The data presented here were obtained using a modification of the Standard Methods methylene blue procedure on an automatic analyzer.

The Benthos

Animals and plants that live in or on the bottom substrata of lakes and streams are known as the benthos. This biological community includes such common animals as immature insects, worms, clams, snails, and crustacea. The benthic populations found on a stream bottom are largely determined by the type of substrate. Bottoms consisting of soft silty sediments are normally inhabited by animals that are able to burrow into the sediments and feed on organic detritus in the sediments. These include worms, clams, and certain insect larvae. The number of species is usually small in these habitats. Shallow streams with shoals, rapids, and riffles have more available niches for animals to occupy and the normal benthic fauna usually includes a large variety of organisms.

The benthic populations provide a basic indicator of general water quality. Whereas the plankton organisms move downstream with the current, and fish are able to migrate considerable distances, the benthos is a population relatively fixed on the bottom and the animals are subject to the water flowing over them. The benthic populations will therefore be influenced by the quality of the water.

The animals that make up the benthos have various life cycles. Insects may exist as aquatic larvae living in the bottom for as long as 2 years. They then emerge as adults and mate. The female deposits fertilized eggs into the stream. Some of the class produce young which attach themselves to fish. Some of the worms reproduce asexually. An analysis of the age structure of certain forms in the benthos may provide information on past conditions of the water.

Under conditions of good water quality the benthos should include a variety of species with no one species being present in excessive numbers. If the water should become degraded, certain species in the population, intolerant of the changed environment, will die out; and as the water quality deteriorates, increased numbers of species in the benthos will be eliminated. The one or more species that survive may be able to develop very large populations. Toxic materials in the water or deposited on the bottom may effectively eliminate all bottom life.

At each station where bottom samples are taken an attempt is made to find areas of suitable substrate. From these areas, where pos-

sible, a series of at least six quantitative samples is taken by means of suitable dredges or samplers. In riffles the Surber squarefoot sampler is used. In deep rivers the Ekman or Peterson dredge is used (see Standard Methods, for the Examination of Water and Wastewater, 11th edition, pp. 572–582) (22). A general qualitative collection of invertebrate life is usually made at all stations.

The bottom materials are screened in the field using a screen with 28 meshes to the inch. The concentrated sample is preserved in alcohol and returned to the laboratory.

In the laboratory the sample is transferred to pans and the macroscopic organisms are separated from the sediment and detritus. The animals are then identified as near to species as possible, enumerated, and weighed. Specimens are preserved and retained for future reference.

During this year benthos data were gathered for stations in the Ohio and Tennessee River basins only and are presented with the descriptive material for the appropriate stations. A supplemental analysis of these data will be published separately.

Fish Populations

Fish are a biological end product of the aquatic environment. They are an important source of food, and sport fishing is one of our leading forms of recreation. The maintenance of fish life has been recognized by the Congress, and by States which have protective pollution control legislation, as an important and legitimate use of our Nation's waterways. In other words, in measuring fish populations at Surveillance System stations, we are not measuring a parameter that affects a water use as in the case of other measurements presented in this compilation, but rather a unique parameter that is in itself considered a beneficial water use.

The water quality requirements and tolerance of aquatic life to different types of contaminants vary tremendously. It is this variability in response which makes living aquatic organisms usable indicators of environmental disturbance. Fish require water relatively high in dissolved oxygen, and are intolerant of many chemical and physical contaminants resulting from agricultural, industrial and mining practices. However, the tolerance of different species varies, and man-induced changes of the environment often affect one species more than another, producing imbalanced populations which quite often favor the species less desirable economically.

Moderate amounts of putrescible wastes may enrich the habitat, resulting in great increases in standing crops of fish present. However, under such conditions, the more tolerant and adaptable species may comprise a disproportionate share of the total population, and very sensitive species may be eliminated altogether. The effect of toxic wastes may vary from complete elimination of populations to a reduction in reproductive capacity, growth and resistance to disease and parasitism.

Fish kills are a spectacular and obvious indication that an abrupt change has taken place in the environment. However, because of high mobility resulting in rapid recruitment, the fish population in a river or stream may return to normal levels within a very short time after a kill.

Chronic pollution, to which the fish population must adjust over a period of time, will be reflected in the kinds and relative abundance of the fish species present. In addition to the species composition, the condition of the fish, their growth, reproductive success and certainly their palatability are factors of considerable importance in evaluating the suitability of a body of water for supporting usable stocks of fish.

During the current water year, data on fish populations were gathered for some stations in the Ohio and Tennessee River basins only, and are presented in tables in volume 5 for the appropriate stations.

Fish samples at these stations were collected primarily with rotenone and with an electrofishing device. Five percent emulsified rotenone was applied at suitable sites, where an area of 1 to 3 acres could be blocked off with nets during the rotenoning operation. Such sites were usually in the form of small coves along the shoreline, the mouths of small tributaries, or behind the partial enclosure created by navigational lock walls. An electrical shocking device was used along the shoreline both during the day and at night. In a few cases, samples were also collected with trammel nets and with short, 25-foot haul seines. Sampling with nets and seines was limited because of the paucity of habitat in large rivers which is suitable for using these types of gear.

With each method used sufficient sampling was done to collect as many species present as possible, and to obtain a measure of the relative abundance and size distribution of the various species. Every type of fishing gear is somewhat selective, and the data obtained may not be representative of the actual population composition present in the river at the time of sampling. However, the data obtained by a given method are quantitatively comparable and may be used to evaluate changes in the population composition resulting from natural and man-induced changes in the habitat. Comparisons should be based on samples collected with the same gear, during the same season of the year, and under similar conditions of stream flow and water temperature. These data will be particularly useful in determining the impact of changes in water quality on the fish populations of the Nation's rivers over long periods of time.

For convenience of comparison, the fish in the tables are grouped into six major categories based on food habits and methods of feeding:

I. Large, sight feeding carnivores that feed on other fish. This group includes most game species.

II. Species that feed primarily on insects. This group provides important forage for species in group I.

III. Species that feed primarily on plankton and algae. These also provide important forage for group I species.

IV. Species that feed primarily on mollusks.

V. Omnivores that feed indiscriminately on plant and animal matter from the bottom.

VI. Scavengers that take any available food. Some of the species in this group may sometimes act as predators. The group also includes many important food fish, and species that are tolerant of degraded conditions.

Because foods and feeding habits vary with size, age, and availability of food, there may be considerable overlap between groups. The species listed were grouped according to available literature regarding the main foods of adult specimens of each species.

In the field the total length of the fish was routinely measured to the nearest inch class on a one-half inch interval. Thus a fish in the 5-inch class would measure from 4.5 inches to slightly under 5.5 inches. If the end of the tail touched the dividing line between two length classes, the fish was included in the higher classification. The percent total number and weight are carried to the nearest one-tenth of 1 percent in the tables. The one-tenth of 1 percent was arbitrarily selected for purposes of tabulation, and does not imply such a high level of sampling accuracy.

The fish are listed by common names in the tables according to American Fisheries Society Special Publication No. 2 (1960), A List of the Common and Scientific Names of Fishes From the United States and Canada, Second edition (*1*).

Stream Flow

Stream flow data have a most important role in the utilization of water quality parameters such as are included in this report. For this reason, average daily flow records are reported for most of the sampling stations in the System.

All flow data included in this compilation are *provisional* data furnished by the agencies credited, and are subject to revision by such agencies prior to any final publication. With the exceptions mentioned, the flows are given as furnished to the Public Health Service.

The data were generally furnished in units of cubic feet per second. In general only the first three digits were considered significant. Because of machine limitations the data are reported here in thousand cubic feet per second. Even though three zeros may appear after the decimal, no artificial accuracy of measurement is implied. Only the first three digits should be considered significant. There are two exceptions:

(1) When the flow was over 1 million cubic feet per second, the first four digits are reported, and (2) at times when the Rio Grande flows were extremely low, the data were reported to tenths of a cubic foot per second. These figures are published showing 4 decimal places.

Flow data for sampling stations on the rivers of the Great Lakes system are reported as the monthly mean flow, as computed by the U.S. Lake Survey. In certain other rivers, flow data were computed by the Public Health Service from information supplied by the gaging agency. The methods of computations are shown as footnotes to the data for the applicable stations.

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Explanation of Analytical Data

RADIOACTIVITY DETERMINATIONS

In evaluating radioactivity data it should be noted that the reported errors represent counting errors only and the reported values are subject to other errors commonly associated with gross radioactivity analysis. (See Reference 22.)

A dash (—) in the count column signifies that no determination was made. An asterisk (*) following date of sample indicates that determinations are for composites of two or more samples taken on and before the date shown.

Strontium 90 determinations are reported in micro-microcuries per liter as measured from total solids in the sample composited for the quarter. A dash (—) indicates that no determination was made in that period.

PLANKTON POPULATION

Plankton data are reported on two pages. The first page lists the population size of various groups of algae. A coded number shows the ten most abundant genera of algae and their count level. Code numbers used are identified on page 18. Blank spaces on the data sheets signify that counts of other genera were below a level of 150 per ml. The second page of plankton data lists the four dominant diatom species and their occurrence as a percent of the total diatom population. The percent of occurrence of all other diatom species is shown in the next column. Identification codes of species are given on page 19.

The detectable numbers per ml. of fungi, sheathed bacteria and protozoa are shown in the next two columns. The rotifer and crustacea totals per liter are listed together with the genera where these occurred at a count level of five or more per liter for rotifers and three or more per liter for crustacea. Nematode and miscellaneous animal form counts per liter appear in the last two columns.

A dash (—) indicates that no analysis was made. A zero count of each group is indicated by "0". Blank spaces under abundance and dominance columns indicate that the populations were too few to be included or were absent. Coding for abundant genera of rotifer and crustacea population levels are presented on page 20.

PLANKTON POPULATION

Identification Codes of Algae Genera and Count Levels of Most Abundant Genera

KEY TO COUNT LEVEL (per ml.)

1 150 to 300
2 301 to 600
3 601 to 1,200
4 1,201 to 2,400
5 2,401 to 4,800
6 4,801 to 9,600
7 9,601 to 19,200
8 19,201 to 38,400
9 38,401 and over

Code to ALGAE GENERA (Producers)

Blue-green Algae

01 Agmenellum (Merismopedia)
02 Anacystis (Microcystis)
03 Anacystis
04 Coccochloris
05 Gomphosphaeria
06, 07, 08 Reserve
09 Other genus
10 Other genus

Filamentous blue-greens

11 Anabaena
12 Aphanizomenon
13 Arthrospira
14 Lyngbya
15 Oscillatoria
16 Phormidium
17 Raphidiopsis
18 Spirulina
19, 20, 21 Reserve
22 Other genus
23 Other genus

Coccoid green algae

24 Actinastrum
25 Ankistrodesmus
26 Chlorella-type
27 Chlorococcum
28 Closterium
29 Coelastrum
30 Crucigenia
31 Dictyosphaerium
32 Golenkinia
33 Lagerheimia
34 Micractinium
35 Oocystis
36 Palmellococcus
37 Pediastrum
38 Scenedesmus
39 Staurastrum
40 Tetradesmus
41 Tetrastrum
42, 43 Reserve
44 Other genus
45 Other genus

Filamentous green algae

46 Cladophora
47 Stichococcus
48 Stigeoclonium
49 Reserve
50 Other genus

Green flagellates

51 Chlamydomonas including Carteria
52 Euglena
53 Lepocinclis
54 Pandorina
55 Phacotus
56 Phacus
57 Trachelomonas
58 Reserve
59 Other genus

Other pigmented flagellates

60 Chromulina
61 Dinobryon
62 Gymnodinium
63 Peridinium
64 Reserve
65 Other genus

Diatoms (with chromatophores)

Centric

66 Biddulphia
67 Coscinodiscus
68 Cyclotella
69 Melosira
70 Rhizosolenia
71 Stephanodiscus
72 Other genus

Pennate

73 Achnanthes
74 Amphiprora
75 Amphora
76 Anomoeoneis
77 Asterionella
78 Caloneis
79 Cocconeis
80 Cymatopleura
81 Cymbella
82 Diatoma
83 Diploneis
84 Fragilaria
85 Gomphonema
86 Gyrosigma
87 Navicula
88 Nitzschia
89 Pleurosigma
90 Rhoicosphenia
91 Surirella
92 Synedra
93 Tabellaria
94, 95, 96 Reserve
97 Other genus
98 Other genus
99 Other genus

PLANKTON POPULATION

Identification Code for Diatom Species

No.	Species
01	Achnanthes lanceolata
02	Achnanthes minutissima
03	Achnanthes sp.
04	Amphiprora paludosa
05	Amphiprora sp.
06	Amphora ovalis
07	Amphora sp.
08	Anomoeoneis exilis
09	Asterionella formosa
10	Bacillaria paradoxa
11	Biddulphia laevis
12	Caloneis amphisbaena
13	Caloneis sp.
14	Ceratoneis arcus
15	Cocconeis pediculus
16	Cocconeis placentula
17	Cocconeis sp.
18	Coscinodiscus rothii
19	Coscinodiscus (brackish)
20	Coscinodiscus sp.
21	Cymatopleura solea
22	Cymatosira belgica
23	Cyclotella atomus
24	Cyclotella comta
25	Cyclotella kutzingiana
26	Cyclotella meneghiniana
27	Cyclotella pseudostelligera
28	Cyclotella stelligera
29	Cyclotella striata
30	Cyclotella sp.
31	Cymbella ventricosa
32	Cymbella tumida
33	Cymbella sp.
34	Denticula sp.
35	Diatoma elongatum
36	Diatoma vulgare
37	Diatoma sp.
38	Diploneis smithii
39	Diploneis sp.
40	Epithemia turgida
41	Epithemia sorex
42	Epithemia sp.
43	Eunotia sp. (first)
44	Eunotia sp. (second)
45	Fragilaria capucina
46	Fragilaria construens
47	Fragilaria crotonensis
48	Fragilaria pinnata
49	Fragilaria sp.
50	Frustulia sp.
51	Gomphonema olivaceum
52	Gomphonema sp.
53	Gyrosigma kutzingii
54	Gyrosigma sp.
55	Hantzchia amphioxys
56	Melosira ambigua
57	Melosira distans var. alpigena
58	Melosira granulata
59	Melosira binderana
60	Melosira islandica
61	Melosira italica
62	Melosira varians
63	Meridion circulare
64	Navicula cryptocephala
65	Navicula sp. (first)
66	Navicula sp. (second)
67	Nitzschia acicularis
68	Nitzschia tryblionella
69	Nitzschia denticula
70	Nitzschia (Lancelolatae group)
71	Nitzschia sp. (first)
72	Nitzschia sp. (second)
73	Opephora martyi
74	Pinnularia sp.
75	Pleurosigma delicatulum
76	Rhoicosphenia curvata
77	Rhizosolenia eriensis
78	Rhopalodia gibba
79	Rhopalodia sp.
80	Stephanodiscus astraea var. minutula
81	Stephanodiscus dubius
82	Stephanodiscus hantzschii
83	Stephanodiscus niagarae
84	Stephanodiscus sp.
85	Surirella brightwelli
86	Surirella ovata
87	Surirella striatula
88	Surirella sp.
89	Synedra acus
90	Synedra pulchella
91	Synedra nana
92	Synedra ulna
93	Synedra vaucheriae
94	Synedra sp.
95	Tabellaria fenestrata
96	Tabellaria flocculosa
97	Any entity not found above (first)
98	Any entity not found above (second)
99	Reserved for future entity
xx	Insignificant or population inadequate

PLANKTON POPULATION

Identification Codes of Microinvertebrate Genera and Count Levels of Most Abundant Genera

Genera of ROTIFERS
Key to counts per liter

1 5 to 10
2 11 to 20
3 21 to 40
4 41 to 80
5 81 to 160
6 161 to 320
7 321 to 640
8 641 to 1,680
9 1,681 and over

Genera of CRUSTACEA
Key to counts per liter

1 3 to 5
2 6 to 10
3 11 to 20
4 21 to 40
5 41 and over

Code to
MICROINVERTEBRATES

Rotifers

01 Asplanchna
02 Brachionus (also Platyias)
03 Collotheca
04 Cephalodella
05 Chromogaster
06 Euchlanis
07 Filinia
08 Gastropus
09 Hexarthra (also Pedalia)
10 Kellicottia
11 Keratella
12 Lepadella
13 Monostyla (also Lecane)
14 Notholca
15 Philodina and similar contracted bdelloids
16 Ploesoma
17 Polyarthra
18 Pompholyx
19 Proales
20 Rotaria
21 Synchaeta
22 Trichocerca
23 to 45 Reserve
46 Other genus
47 Other genus
48 Other genus
49 Other genus

Cladocerans

50 Nauplii
51 Bosmina and related genera
52 Daphnia and related genera
53 Moina
54 Polyphemus
55 to 72 Reserve
73 Other genus
74 Other genus
75 Other genus

Copepods

76 Cyclops, Euclops, and Paracyclops
77 Diaptomus
78 to 97 Reserve
98 Other genus
99 Other genus

Blank—Insignificant or population inadequate

ORGANIC CHEMICALS

Although units of concentration may be assigned to the values reported herein (µg/l or parts per billion), it is essential that the user of these data consider additional associated information. Introspective examination of the data reported herein has indicated that comparison of concentration values obtained from samples of similar gallonage are more valid than samples of widely differing gallonage. In addition, recent experimental researches have shown that lower flow rates and lower sample volumes than those employed (5,000 gallons at 0.5 gpm) are substantially more efficient and should produce relatively higher concentration values with this method. The first in a series of changes designed to increase sampling efficiency is already underway at Water Pollution Surveillance System stations.

Concentration values reported for specific substances are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE. In light of an unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

Zeros when reported have been entered. A dash indicates that the respective results were not reported. An asterisk in the column showing end of sample date indicates that the determinations are for composited samples taken on and before the date shown. The extent of compositing can be determined by examining the gallons filtered, which is the sum of the applicable individual samples immediately above it.

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

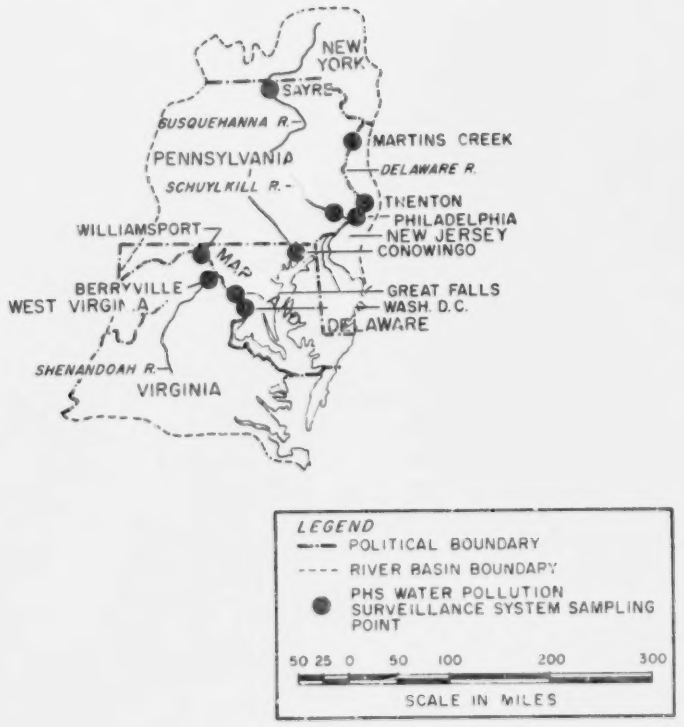
The data entered in each column are as reported. Concentrations of alkalinity and hardness are reported in milligrams per liter as $CaCO_3$. A dash signifies that the particular test was not performed. Zeroes when meaningful have been entered. An asterisk preceding a number should be read as "less than" the number following it.

TRACE ELEMENTS AND OTHER DETERMINATIONS

For a discussion of the sensitivity limits of the determinations performed with spectrographic methods, see page 11.

BASIN 2

NORTH ATLANTIC



The North Atlantic basin contains 10 Water Pollution Surveillance System stations in 3 major river systems.

Potomac River: The Potomac River drains the eastern slope of the Allegheny Mountains. The headwaters are in mountainous terrain. The river is tidal below Great Falls, Md., just upstream from Washington, D.C., and discharges to Chesapeake Bay. The average annual temperature is about 54° F., average precipitation is 38 inches, and average snowfall ranges from 30 inches at the headwaters to 5 inches near the mouth. The major tributary to the Potomac is the Shenandoah River. There are industrial developments in the upper reaches of both the Shenandoah and Potomac Rivers. Hydroelectric power plant operations on the Shenandoah exert a major influence on the flow regimen. The Potomac is the interstate boundary separating Maryland and Virginia for a large portion of its length.

Susquehanna River: The Susquehanna River is the largest stream in the United States which discharges to the Atlantic Ocean. Its headwaters are in the State of New York and it flows in a southerly course across Pennsylvania to discharge into the head of Chesapeake Bay. From the northern to the southern portion of the basin, annual precipitation varies from 42 to 40 inches, snowfall from 50 to 35 inches, average summer temperatures from 66° to 76° F., and average winter temperatures from 22° to 34° F. Surveillance stations are located near the points where the river enters and leaves Pennsylvania.

Delaware River: The Delaware rises in the western slope of the Catskill Mountains of east central New York and flows southerly into Delaware Bay. Average annual precipitation varies from 50 inches at the headwaters to 40 inches in the lower watershed. Corresponding winter temperatures are 23° and 36° F.; summer temperatures are 66° and 76° F.; and snowfall, 50 inches and 30 inches or less. The Delaware forms the State boundary between New York and Pennsylvania and between Pennsylvania and New Jersey. The lower reach is polluted by industrial and municipal wastes. The Schuylkill River is a major tributary to the Delaware and this river flows through coal producing areas. There is some acid mine drainage present in addition to munic-

Preceding page blank

ipal and industrial wastes. The lower reach of the Schuylkill is open to navigation.

Phytoplankton counts at stations in this basin generally do not exceed 10,000/milliliter. Diatoms and coccoid greens comprise the bulk of the algae. The phytoplankton is dominated by pennate diatoms except during the summer months (June–September) when seasonal blooms of the coccoid greens (largely *Scenedesmus, Ankistrodesmus, Actinastrum,* and *Oocystis*) may exceed 50,000/milliliter. The most abundant pennate diatom is *Synedra ulna.* The centric diatoms are represented largely by *Stephanodiscus hantzschii, Cyclotella meneghiniana,* and *Cyclotella pseudostelligera.* Rotifer and micro crustacea populations are low, rarely exceeding 100/liter.

DELAWARE RIVER AT PHILADELPHIA, PENNSYLVANIA

This station is located at the northeastern city limits of Philadelphia, Pennsylvania approximately 90 miles from where the river empties into Delaware Bay. Samples are taken at the intake of the Torresdale municipal water plant. The river at this point is the State border between Pennsylvania and New Jersey and is subject to tidal influence.

The Delaware River in the vicinity of this station flows through a heavily populated and industrialized area and is used extensively for water supply and waste disposal. Agricultural activity in upstream areas is extensive with row crops, livestock and dairy farming predominating.

736 - 493 O - 64 - 3

Station Location:	Delaware River at Philadelphia, Pennsylvania
Major Basin:	North Atlantic
Minor Basin:	Delaware-Schuylkill Rivers
Station at:	40°02' Latitude 75° Longitude
Miles above mouth:	90
Activation Date:	November 4, 1957
Sampled by:	Philadelphia Water Department
Field Analysis by:	Philadelphia Water Department
Other Cooperating Agencies:	Pennsylvania State Department of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Trenton, New Jersey
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	6,780 square miles
Period of record:	1912 to present
Average discharge in record period:	11,830 cfs.

Maximum discharge in record period: 329,000 cfs.

Minimum discharge in record period: 1,220 cfs.

Remarks: Stream flows affected by power plants on tributaries and upstream lakes and reservoirs. Diversion for municipal supply not included.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3- 4-63	0.16
3-11-63	0.10
3-18-63	0.12
3-27-63	0.07
4- 1-63	0.05
4- 8-63	0.07
4-15-63	0.08
4-23-63	0.04
4-29-63	0.08
5- 6-63	0.07
5-13-63	0.09
5-20-63	0.08
5-27-63	0.08
6- 3-63	0.07
6-10-63	0.10
6-17-63	0.10
6-24-63	0.09
7- 1-63	0.10
7- 8-63	0.10
7-15-63	0.10
7-22-63	0.12
8- 5-63	0.11
8-12-63	0.08
8-19-63	0.09
8-26-63	0.13
9- 3-63	0.12
9- 9-63	0.19
9-23-63	0.17
9-30-63	0.18

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 1/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.18	.3
	Na	9.0	6.3
	K	2.7	1.5
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	6	21
	Cd	*1	*1
	As	*6	*7
	B	25	38
	P	33	9
	Fe	126	6
	Mo	25	6
	Mn	.8	1
	Al	—	20
	Be	*.02	.04
	Cu	17	23
	Ag	*.1	*.2
	Ni	1	*1
	Co	*1	*1
	Pb	*3	*2
	Cr	*1	*2
	V	*1	7
	Ba	26	26
	Sr	41	30

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.4	.8	April to June	1.1	.3
January to March	—	—	July to September	—	—

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
10/11 - 10/22/62	DDT	
11/9 - 11/20/62	DDT	
5/28 - 6/17/63	Dieldrin	0.026
5/28 - 6/17/63	DDT	0.070
8/23 - 9/9/63	Dieldrin	0.033
8/23 - 9/9/63	DDT	0.015
8/23 - 9/9/63	DDD	0.080
8/23 - 9/9/63	DDE	0.012

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION DELAWARE RIVER AT PHILADELPHIA, PENNSYLVANIA 12

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER													RADIOACTIVITY IN PLANKTON				
					ALPHA						BETA							DATE OF DETERMINATION	GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±		MO. DAY	pc/g	±	pc/g	±
10	1	62	10	23	-	-	-	-	-	-	6	6	20	7	26	9						
10	8	62	11	9	-	-	-	-	-	-	4	5	14	7	18	9						
10	15	62	12	22	-	-	-	-	-	-	7	5	11	6	18	8						
10	22	62	12	5	0	0	0	1	0	1	8	6	17	7	25	9						
10	29	62	11	23	-	-	-	-	-	-	5	4	13	5	18	7						
11	26	62	12	21*	0	0	0	0	0	1	16	6	24	6	40	8						
12	26	62	1	21*	1	1	0	1	1	1	18	4	15	3	33	4						
1	28	63	2	19*	1	2	0	1	1	2	36	10	23	7	59	12						
2	25	63	3	11*	1	1	1	1	2	1	46	8	32	6	78	10						
3	25	63	4	15*	1	1	0	1	1	1	64	4	39	4	103	6						
4	29	63	5	20*	1	2	1	1	2	2	42	7	22	3	64	8						
5	27	63	6	7*	1	1	1	1	2	1	19	7	30	7	49	10						
6	24	63	7	17*	1	1	1	1	2	1	16	6	32	9	48	11						
7	29	63	8	16*	0	0	0	1	0	1	11	6	24	7	35	9						
8	26	63	9	20*	1	1	0	1	1	1	5	5	20	6	25	8						
9	30	63	10	22*	1	1	1	1	2	1	8	4	18	5	26	6						

PLANKTON POPULATION

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION DELAWARE RIVER AT PHILADELPHIA, PENNSYLVANIA 012

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Flagellates) (Number per ml)	ROTIFERS										CRUSTACEA									HELMINTHOSES (Helminth eggs) (Number per liter)	OTHER AERIAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)									
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
10	1	62	19	46	29	15	58	14	26	6	19	-	-	38	11	3	17	2							0							0	0
10	15	62	29	20	19	19	56	8	58	7	46	-	-	2											0							1	0
11	5	62	92	22	19	16	26	13	58	8	41	-	-	0											0							1	0
11	19	62	92	27	62	11	26	5	29	5	52	50	-	0											0							0	0
12	3	62	19	65	92	13	29	12	62	8	2	30	-	1											0							0	0
12	17	62	19	19	29	18	92	13	36	11	39	-	-	0											0							0	0
1	7	63	92	19	29	18	58	8	56	8	47	-	-	0											1							0	0
1	21	63	92	63	36	8	29	6	14	3	20	-	-	0											0							0	0
2	4	63	92	41	29	10	36	5	2	4	40	-	-	0											0							0	0
2	18	63	92	53	29	6	26	4	19	4	33	-	-	-											-							-	-
3	4	63	92	47	14	14	29	8	19	7	24	-	-	0											0							0	0
3	18	63	92	28	14	14	51	7	64	6	45	-	-	0											1							1	0
4	1	63	92	28	93	10	46	6	29	5	51	-	-	0											0							0	0
4	15	63	92	42	62	11	36	9	19	9	29	-	-	0											0							0	0
5	6	63	92	68	82	10	70	5	31	4	13	-	-	-											-							-	-
5	20	63	92	50	29	10	26	4	62	4	32	-	-	-											-							-	-
6	3	63	92	35	19	9	29	9	47	7	40	-	-	-											-							-	-
6	17	63	82	20	92	15	26	13	56	8	44	-	-	-											-							-	-
7	1	63	82	21	64	15	70	13	26	10	41	-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63	58	79	56	9	29	3	19	2	7	-	-	-											-							-	-
8	19	63	58	89	26	4	56	3			4	-	-	-											-							-	-
8	31	63	58	73	26	5	56	4	29	3	15	-	-	-											-							-	-
9	16	63	58	71	56	14	26	3	92	2	10	-	-	-											-							-	-
9	30	63	58	73	56	7	26	4	29	2	14	-	-	-											-							-	-

PLANKTON POPULATION

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION DELAWARE RIVER AT PHILADELPHIA, PENNSYLVANIA 12

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	600	30	100	200	0	20	0	190	40	80	80																		
10	15	62	1800	0	0	660	0	40	40	500	580	0	210	38	2	68	1	71	1	92	1										
11	5	62	500	0	20	90	0	20	0	230	140	290	200																		
11	19	62	300	0	50	30	0	0	0	110	90	80	300																		
12	3	62	100	0	0	0	0	0	0	20	50	30	110																		
12	17	62	300	0	0	20	0	20	0	20	220	40	620																		
1	7	63	100	0	0	40	0	20	0	40	40	150	240																		
1	21	63	200	0	0	0	0	20	0	20	180	90	110																		
2	4	63	200	0	0	0	0	0	0	30	120	20	120																		
2	18	63	500	0	0	20	0	0	150	20	270	0	480	92	1																
3	4	63	400	0	0	0	0	20	90	40	290	0	260	92	1																
3	18	63	500	0	0	0	0	0	0	40	480	0	230	92	1																
4	1	63	100	0	0	0	0	0	0	0	130	0	200																		
4	15	63	400	0	0	0	0	70	0	110	200	130	620																		
5	6	63	1300	0	0	150	0	260	0	200	640	180	440	52	1	92	1														
5	20	63	300	0	0	20	0	20	0	70	220	700	1010																		
6	3	63	500	20	20	110	0	20	0	130	150	200	510																		
6	17	63	100	0	0	70	0	20	0	20	20	20	70																		
7	1	63	500	0	0	310	0	20	0	120	20	100	250																		
7	15	63	900	0	20	180	0	0	0	660	20	310	230	69	2																
8	5	63	2800	370	0	1060	0	70	0	1110	220	1230	890	69	3	38	2	68	1	10	1										
8	19	63	2400	60	20	80	40	20	0	1350	870	1010	3310	69	4	77	1	84	1												
8	31	63	1900	20	20	800	0	90	0	710	190	990	670	69	3	38	1	24	1												
9	16	63	2000	50	0	680	0	610	0	480	160	70	140	51	2	69	2	38	1												
9	30	63	1700	70	20	810	0	140	0	610	50	110	380	38	2	68	2	69	1	34	1										

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION DELAWARE RIVER AT PHILADELPHIA, PENNSYLVANIA 12

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
BEGINNING			END								NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	11	62	10	22	7510	173	57	116	1	11	25	3	3	18	1	8	5	1	6
11	9	62	11	20	7445	97	33	64	0	7	17	4	3	9	1	4	2	1	2
2	8	63	2	21	6745	162	77	85	2	16	33	5	4	21	3	10	6	2	8
3	15	63	4	1	4849	191	82	109	2	18	35	4	4	25	2	8	4	2	13
4	19	63	5	6	6355	124	48	76	2	10	21	4	3	13	1	5	3	1	6
5	28	63	6	17	5959	267	144	123	7	30	49	3	5	40	1	16	15	3	24
7	11	63	7	25	5940	225	121	104	2	28	48	4	5	37	2	18	12	3	10
8	23	63	9	9	6621	215	116	99	2	22	47	8	6	30	3	15	18	2	10

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN DELAWARE-SCHUYLKILL RIVERS
STATION LOCATION DELAWARE RIVER AT
PHILADELPHIA, PENNSYLVANIA 12

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	18.3	6.4	7.2	3.0	11	6.0	8.0	1.1	11	45	74	17	20	29	.3	131	5200
10	8	62	21.1	3.8	7.3	3.2	9	5.0	8.0	1.5	14	47	76	14	35	36	.3	140	-
10	15	62	18.9	6.4	7.2	2.8	19	-	7.0	.9	8	42	90	15	30	35	.2	136	6600
10	22	62	17.2	5.4	7.1	3.0	10	4.0	7.0	.6	9	33	60	15	20	29	.5	89	7600
10	29	62	12.2	8.4	7.2	3.2	12	5.0	8.0	.5	10	34	66	15	20	33	.3	112	85000
11	5	62	12.2	4.2	7.3	3.6	12	7.0	9.0	.3	18	40	76	15	30	30	.4	126	3800
11	12	62	10.0	7.4	7.1	2.0	15	6.0	9.0	1.2	9	34	60	30	45	25	.2	92	-
11	13	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9700
11	19	62	10.0	4.8	7.0	2.6	15	5.0	10.0	2.4	7	22	44	23	45	24	.5	87	9000
11	26	62	5.0	5.4	7.1	2.8	10	6.0	9.0	1.9	10	28	50	25	75	33	.3	101	40000
12	3	62	7.2	11.4	7.1	2.6	16	8.0	9.0	2.7	7	28	50	28	70	29	.5	-	3300
12	10	62	6.7	5.8	7.1	3.6	15	6.0	8.0	2.0	12	30	58	25	90	31	.3	119	-
12	17	62	1.1	5.4	7.1	2.4	23	6.0	8.0	1.9	7	26	46	25	85	27	.3	154	53000
12	24	62	.6	4.6	7.3	2.2	21	7.0	7.0	1.7	10	34	58	7	150	24	.2	107	-
12	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27000
1	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16000
1	3	63	2.2	6.6	7.3	3.0	9	3.0	10.0	1.5	11	38	60	15	155	32	.2	136	-
1	7	63	1.1	5.8	7.1	3.2	10	-	10.0	2.7	11	30	60	16	105	32	.2	132	6000
1	14	63	1.1	5.2	7.2	3.4	37	8.0	10.0	2.6	11	39	66	16	80	27	.6	153	23000
1	21	63	.0	12.6	7.4	2.8	14	8.0	9.0	2.1	12	33	64	17	150	32	.3	147	38000
1	28	63	1.1	13.4	7.1	2.2	19	8.0	10.0	.8	26	32	70	20	135	26	.7	115	200000
2	4	63	.6	10.8	7.2	2.8	15	8.0	9.0	.9	15	31	64	21	170	29	.3	102	9300
2	11	63	1.1	12.8	7.2	3.0	9	8.0	10.2	1.2	14	33	62	15	145	33	.4	-	26000
2	18	63	1.0	12.2	7.2	-	18	10.7	11.5	1.2	11	30	52	35	185	27	.3	96	*330
2	25	63	1.1	11.4	7.3	-	17	8.8	12.0	1.9	16	32	62	17	110	28	.5	98	22000
3	4	63	2.2	12.0	7.3	2.8	15	10.7	11.0	1.7	15	35	68	18	60	31	.4	104	5300
3	11	63	3.3	11.0	7.2	5.8	23	11.9	13.0	1.0	10	27	60	21	95	29	.4	85	62000
3	18	63	6.1	11.8	7.4	3.0	10	7.8	8.8	1.2	22	33	66	16	35	36	.2	85	5900
3	25	63	5.5	12.0	7.0	2.6	7	7.0	7.1	.8	20	21	60	22	65	29	.2	70	4000
4	1	63	7.2	11.2	7.1	2.8	5	6.0	7.2	.8	19	20	62	7	70	15	.2	48	1100
4	8	63	8.9	10.2	7.2	2.4	11	4.0	6.0	1.5	7	18	40	25	85	19	1.7	-	1000
4	15	63	9.4	10.0	7.3	2.2	11	8.5	8.9	1.3	8	26	42	5	190	28	.2	-	6700
4	22	63	12.0	9.0	7.3	1.0	10	8.3	8.8	1.0	8	28	56	5	125	23	.3	75	15000
4	29	63	13.9	8.2	7.3	1.2	8	7.1	9.1	.7	6	32	52	6	70	22	.3	78	2800
5	6	63	14.4	9.0	7.2	2.0	9	8.6	8.8	2.0	6	32	50	3	70	22	.3	87	50
5	13	63	16.7	6.8	7.3	1.4	9	9.0	9.1	.7	7	31	58	5	80	24	.2	85	-
5	20	63	18.9	6.8	7.3	2.0	14	8.1	12.2	1.0	11	34	56	22	70	29	.6	116	-
5	27	63	18.9	6.1	7.1	1.0	12	8.0	10.0	.9	7	31	50	20	120	22	.3	73	150000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN DELAWARE-SCHUYLKILL RIVERS
STATION LOCATION DELAWARE RIVER AT PHILADELPHIA, PENNSYLVANIA 12

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	3	63	20.0	6.6	7.1	.8	16	7.0	9.0	.6	8	27	50	15	120	22	.3	87	130000
6	10	63	22.2	4.2	7.3	7.8	8	6.5	7.5	.5	6	29	54	20	95	22	.4	97	8000
6	17	63	23.9	1.8	7.0	2.6	13	4.9	6.8	.4	14	31	64	35	100	29	.7	107	5300
6	24	63	23.9	3.4	7.2	3.8	6	5.6	10.0	.4	9	34	80	34	160	28	.3	104	2100
7	1	63	24.4	2.6	7.2	3.0	9	5.4	9.0	.3	13	35	50	45	90	25	.5	100	9200
7	8	63	27.2	4.2	7.4	2.6	9	6.8	11.0	.2	24	36	88	25	80	29	.2	113	52000
7	15	63	26.7	4.2	7.3	-	7	6.8	7.0	.2	12	36	80	25	55	36	.4	115	44000
7	22	63	26.7	2.4	7.2	.8	18	6.8	9.1	.2	15	37	66	10	60	32	.4	127	200000
7	29	63	26.7	4.8	7.3	2.2	10	6.8	10.8	.2	16	37	70	5	50	30	.4	127	3000
8	5	63	27.8	4.2	7.4	2.4	10	6.9	9.9	.3	15	38	70	18	45	30	.4	111	3000
8	12	63	22.8	3.2	7.2	1.2	9	8.0	10.5	.1	14	39	60	8	45	29	.4	120	10000
8	19	63	25.6	5.6	7.1	-	7	5.9	9.0	.2	23	35	94	3	40	36	.4	129	-
8	21	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6500
8	26	63	24.4	5.6	7.2	2.0	14	4.0	8.7	.2	11	38	66	9	40	31	1.4	124	-
8	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15000
9	2	63	23.9	5.8	7.2	2.2	13	4.8	9.0	.4	25	36	76	12	55	32	.5	132	-
9	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30000
9	9	63	23.9	5.2	7.4	1.0	13	6.0	8.9	.1	13	32	70	15	45	33	.3	129	*200
9	16	63	23.3	6.1	7.2	1.8	12	6.9	9.0	.2	18	37	70	3	45	30	.2	122	10000
9	23	63	21.1	5.6	7.2	2.2	15	5.0	8.8	.2	17	35	68	5	65	32	.5	126	86000
9	30	63	21.1	4.2	7.2	3.2	16	4.2	8.0	.6	11	34	90	7	45	35	.3	140	1300

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Trenton, New Jersey
Operated by U.S. Geological Survey

STATE: Pennsylvania

MAJOR BASIN: North Atlantic

MINOR BASIN: Delaware-Schuylkill Rivers

STATION LOCATION: Delaware River at Philadelphia, Pennsylvania

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	4.400	6.800	6.840	3.300	6.400	4.520	43.200	8.450	5.510	3.950	3.520	2.420
2	4.040	7.700	6.400	4.000	6.000	5.060	35.900	9.740	5.320	4.450	3.850	2.680
3	3.450	8.600	6.060	4.500	7.000	5.060	30.900	10.200	4.940	3.920	3.550	2.230
4	3.050	11.500	5.820	4.750	7.300	5.580	30.200	9.150	4.750	3.490	4.790	2.300
5	3.210	10.500	5.820	5.000	6.400	9.380	29.100	8.100	4.560	3.060	4.310	2.600
6	4.640	9.200	6.920	4.750	8.400	18.600	25.300	7.350	4.490	2.400	3.620	2.860
7	7.500	8.700	11.000	4.500	8.000	21.900	20.200	6.800	4.560	2.300	2.920	2.650
8	7.500	8.300	13.700	4.100	7.400	17.600	17.100	6.650	4.490	2.450	2.650	2.450
9	6.880	7.800	15.000	4.500	6.000	15.500	15.300	6.060	5.130	2.520	2.700	2.380
10	6.500	12.000	12.400	4.750	6.900	13.200	14.200	6.020	4.960	2.780	2.860	2.140
11	5.980	18.800	11.000	4.630	6.200	14.900	13.200	7.080	4.750	3.270	3.420	2.040
12	5.220	19.600	9.740	5.100	7.000	13.400	12.300	9.050	4.240	3.030	3.350	2.330
13	5.100	18.000	8.250	8.000	7.000	14.800	11.400	8.700	4.060	2.550	2.570	3.250
14	7.020	15.700	6.600	9.200	7.000	13.700	10.200	7.950	4.680	2.570	2.400	2.730
15	7.000	13.500	6.400	8.350	6.500	14.700	9.500	7.550	5.170	2.750	2.810	2.700
16	5.450	11.300	6.600	8.350	6.400	15.500	8.850	7.300	4.980	2.840	2.700	2.470
17	4.660	10.800	6.600	8.200	5.460	18.000	8.300	7.040	5.050	2.950	2.330	2.330
18	4.110	10.200	6.600	7.450	5.340	20.900	7.900	7.040	5.050	2.730	2.180	2.330
19	3.800	10.300	7.200	7.040	5.220	22.900	8.200	10.500	4.830	2.550	2.500	2.550
20	3.310	8.950	7.400	9.150	5.700	27.100	8.450	12.700	4.240	2.980	2.700	2.700
21	3.250	8.800	7.000	11.500	6.100	28.300	8.600	12.200	4.090	3.620	2.750	2.700
22	3.350	11.200	6.500	9.100	5.380	25.100	7.800	10.500	4.560	4.640	2.890	2.730
23	3.250	11.300	6.220	8.450	4.630	21.400	7.800	9.560	4.060	4.750	3.030	2.810
24	3.210	11.300	6.960	8.200	4.660	19.000	7.750	8.500	3.780	4.860	2.810	2.260
25	3.350	11.100	5.660	7.200	4.900	18.600	7.850	7.650	3.520	4.060	2.700	2.000
26	3.420	10.600	5.100	6.600	4.110	23.400	8.250	7.080	3.120	3.520	2.600	2.160
27	3.310	8.950	5.180	6.600	4.190	50.900	7.950	6.700	3.060	3.490	2.010	2.280
28	3.720	8.650	4.630	7.000	4.520	82.700	7.450	6.400	3.000	3.300	2.000	2.260
29	3.660	7.850	4.820	6.000		64.900	6.700	6.300	3.000	3.210	1.970	2.650
30	3.080	7.120	4.940	5.400		53.300	6.500	6.220	3.550	2.680	1.930	3.650
31	3.520		3.500	7.100		48.500		6.140		2.730	2.350	

DELAWARE RIVER AT TRENTON, NEW JERSEY

This sampling point is at the intake of the Trenton, N.J. water filtration plant which serves a population of over 180,000. The river at this point is affected by flows from the Lehigh River, 49 miles upstream, which receives industrial discharges and treated municipal wastes from Allentown and Bethlehem, Pennsylvania with an estimated combined sewered population of 205,000 in 1962.

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Station Location: Delaware River at Trenton, New Jersey

Major Basin: North Atlantic

Minor Basin: Delaware River - Zone 2

Station at: 40°13' Latitude 74°47' Longitude

Miles above mouth: 134

Activation Date: November 20, 1961

Sampled by: Trenton Water Department

Field Analysis by: Trenton Water Department

Other Cooperating Agencies: Pennsylvania State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Trenton, New Jersey

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 6,780 square miles

Period of record: 1912 to present

Average discharge in record period: 11,830 cfs. (unadjusted)

Maximum discharge in record period: 329,000 cfs.

Minimum discharge in record period: 1,220 cfs.

Remarks: Flows affected by operations of power plants on tributaries and upstream lakes and reservoirs. Diversions for municipal and industrial supplies to New York City and Trenton metropolitan areas not included.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3- 4-63	0.12
3-18-63	0.06
3-25-63	0.05
4- 1-63	0.04
4- 8-63	0.05
4-15-63	0.08
4-22-63	0.06
5- 6-63	0.04
5-13-63	0.04
5-20-63	0.05
6- 3-63	0.05
6-17-63	0.10
6-25-63	0.06
7- 1-63	0.08
7- 8-63	0.08
7-15-63	0.07
7-23-63	0.07
7-29-63	0.09
8- 5-63	0.07
8-12-63	0.06
8-19-63	0.07
8-26-63	0.10
9- 3-63	0.08
9- 9-63	0.09
9-23-63	0.09
9-30-63	0.09

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.26	.25
	Na	6.0	3.8
	K	2.3	1.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	28	30
	Cd	*1	2
	As	32	*7
	B	40	22
	P	*2	13
	Fe	12	5
	Mo	*2	4
	Mn	*.4	1.0
	Al	—	13
	Be	.2	.2
	Cu	6	9
	Ag	*.2	*.2
	Ni	*1	1
	Co	*2	*1
	Pb	8	*2
	Cr	*1	*2
	V	*1	*4
	Ba	24	7
	Sr	44	27

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.9	.3	April to June	—	—
January to March	—	--	July to September	3.1	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

See page 21.

RADIOACTIVITY DETERMINATIONS

STATE NEW JERSEY

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE RIVER - ZONE #2

STATION LOCATION DELAWARE RIVER AT TRENTON, NEW JERSEY 100

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	10	26	0	0	0	1	0	1	23	6	31	8	54	10						
10	15	62	11	5	0	1	0	1	0	1	9	7	2	4	11	8						
11	5	62	11	28	1	1	0	1	1	1	45	8	20	7	65	11						
11	19	62	12	12	0	0	0	0	0	0	14	6	29	6	43	8						
11	26	62	12	18	0	0	0	0	0	0	11	6	14	6	25	8						
12	10	62	1	4	0	0	1	1	1	1	19	6	22	6	41	8						
12	17	62	1	7	0	1	0	0	0	1	7	4	16	4	23	6						
1	15	63	2	25*	0	1	0	1	0	1	16	4	17	4	33	6						
2	18	63	3	27*	1	1	1	1	2	1	37	7	16	7	53	10						
3	18	63	4	22*	0	1	0	1	0	1	27	3	50	4	77	5						
4	22	63	6	3*	0	0	0	0	0	0	12	3	11	3	23	4						
5	20	63	6	24*	0	0	1	1	1	1	42	4	23	3	65	5						
6	25	63	7	30*	1	0	1	0	2	0	11	6	19	6	30	8						
8	26	63	10	4*	0	1	0	0	0	1	10	6	16	7	26	9						
9	30	63	11	6*	0	0	0	1	0	1	1	6	16	7	17	9						

PLANKTON POPULATION

STATE NEW JERSEY

MAJOR BASIN NORTH 'TLANTIC

MINOR BASIN DELAWARE RIVER - ZONE #2

STATION LOCATION DELAWARE RIVER AT

TRENTON, NEW JERSEY 100

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	PROTOZOA (Identifiable) Number per ml.	MICROINVERTEBRATES — ROTIFERS											MICROINVERTEBRATES — CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
			1ST		2ND		3RD		4TH					NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	62	20	92	16	64	16	16	6	42	-	-	51	15	3	22	1	13	1					0							5	1
10	15	62	70	15	62	13	70	12	92	10	50	-	-	2											0							0	1
11	5	62	62	28	92	20	70	6	16	4	42	-	-	2											1							2	0
11	19	62	92	22	62	16	16	9	36	6	47	-	-	2											0							0	0
12	10	62	92	42	36	13	62	8	31	5	32	-	-	0											0							0	0
12	17	62	92	13	70	12	2	11	36	8	56	-	-	2											0							0	0
1	7	63	92	41	62	6	31	6	36	6	41	-	-	0											0							0	0
2	4	63	92	32	93	11	36	11	70	6	40	-	-	0											0							0	0
2	11	63	92	26	93	10	14	9	36	9	46	-	-	0											0							0	0
2	18	63	92	25	93	20	46	15	14	10	30	-	-	0											0							0	0
3	4	63	14	38	92	30	93	20	31	3	9	-	-	0											0							0	0
3	18	63	92	19	26	16	71	6	86	5	54	-	-	0											0							0	0
4	1	63	2	26	92	16	36	7	31	6	45	-	-	2											0							0	0
4	15	63	93	20	92	15	31	9	2	5	51	-	-	0											0							2	0
5	6	63	92	88	31	5	70	2	14	1	4	-	-	0											-							-	-
5	20	63	92	38	31	27	70	5	47	5	25	-	-	-											-							-	-
6	3	63	92	28	31	18	70	9	62	8	37	-	-	-											-							-	-
6	17	63	27	28	70	14	92	12	2	10	36	-	-	-											-							-	-
7	1	63	2	16	82	14	92	12	62	11	47	-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63	71	36	92	13	70	9	2	6	36	-	-	-											-							-	-
8	19	63	26	82	92	6	71	4	70	2	6	-	-	-											-							-	-
9	3	63	70	33	26	25	70	5	92	5	32	-	-	-											-							-	-
9	16	63	71	19	26	17	70	15	2	10	39	-	-	-											-							-	-
9	30	63	70	21	3	14	26	9	70	9	47	-	-	-											-							-	-

PLANKTON POPULATION

STATE NEW JERSEY
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN DELAWARE RIVER – ZONE #2
STATION LOCATION DELAWARE RIVER AT
TRENTON, NEW JERSEY 100

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
				BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR	TOTAL	COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	1500	0	0	680	0	70	0	230	500	230	2140	38	2																		
10	15	62	10000	80	0	1260	0	190	60	1530	6870	460	1950	88	5	92	3	87	3	73	3	38	3	69	3	68	3	79	2	71	2	81	1
11	5	62	3000	0	0	100	0	0	0	460	2460	0	80	92	3	88	2	69	2	87	1	79	1										
11	19	62	1100	0	0	40	40	0	20	120	870	40	40	87	2	92	1	82	1														
12	10	62	600	0	20	0	0	0	20	70	500	110	540	92	1																		
12	17	62	200	0	0	0	0	20	0	20	110	0	90																				
1	7	63	200	0	0	40	0	20	0	40	110	20	180																				
2	4	63	1100	0	270	0	0	0	0	210	610	110	1300	92	1																		
2	11	63	700	0	20	20	0	40	0	40	620	70	550	92	1																		
2	18	63	700	0	20	40	0	0	230	60	380	80	490	60	1	84	1																
3	4	63	2500	0	0	20	0	0	90	40	2380	0	640	92	4	97	3																
3	18	63	2900	0	0	0	0	70	20	40	2730	40	1740	88	3	92	3	87	1	91	1												
4	1	63	800	0	20	20	0	20	0	110	660	40	1690	73	1																		
4	15	63	400	0	0	40	0	0	150	40	200	0	330	65	1																		
5	6	63	4800	0	20	320	0	80	40	670	3650	40	760	92	5	81	1																
5	20	63	1300	0	0	210	0	40	0	40	1010	130	1550	92	2	81	1	38	1														
6	3	63	4900	90	220	1360	0	790	20	730	1650	150	970	38	3	92	3	51	2	68	2	81	2	88	1	44	1	17	1				
6	17	63	6600	590	110	2380	0	640	0	1470	1360	350	2220	68	4	51	2	2	2	38	2	25	2	88	2	40	1	92	1	26	1	37	1
7	1	63	10900	420	0	6750	0	550	310	860	2000	330	1140	38	5	25	4	73	3	71	3	51	2	3	2	88	2	26	2	37	2	92	2
7	15	63	3400	40	0	2670	0	190	0	230	250	120	700	38	4	51	1	37	1														
8	5	63	5700	0	20	4450	0	170	0	210	870	230	1180	38	5	25	3	88	2	37	1	44	1	24	1	51	1	92	1	68	1		
8	19	63	3200	110	0	1410	0	20	0	1230	450	220	820	69	4	25	2	44	2	88	1	92	1										
9	3	63	6300	0	0	5250	0	20	0	580	470	280	560	38	5	25	3	68	2	88	1	37	1										
9	16	63	1700	0	0	410	0	270	0	540	500	180	450	68	1	51	1	88	1	69	1												
9	30	63	3800	50	20	1450	0	840	0	590	880	160	1110	38	3	51	3	68	2	88	2	25	1	73	1								

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE NEW JERSEY

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE RIVER - ZONE #2

STATION LOCATION DELAWARE RIVER AT
TRENTON, NEW JERSEY 100

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
6	26	63	7	8	4151	323	228	95	8	37	113	24	12	66	11	34	17	4	15
7	31	63	8	13	4970	177	104	73	2	22	45	8	6	28	3	16	9	2	8
9	3	63	9	9	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* FLOW UNKNOWN

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NEW JERSEY

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE RIVER— ZONE #2

STATION LOCATION DELAWARE RIVER AT TRENTON, NEW JERSEY

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORM/100 per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
1	15	63	-	-	7.7	-	-	-	-	-	8	36	64	-	*25	31	.0	93	-
2	4	63	-	-	7.6	-	-	-	-	-	14	30	64	-	*25	30	.0	105	-
2	11	63	-	-	7.5	-	-	-	-	-	7	28	76	5	*25	28	.0	100	-
2	18	63	-	-	7.2	-	-	-	-	-	12	40	64	0	*25	27	.0	90	-
3	4	63	-	-	7.5	-	-	-	-	-	9	32	54	5	*25	28	.0	120	-
3	18	63	-	-	6.7	-	-	-	-	-	6	28	56	5	*25	22	.0	95	-
3	25	63	-	-	6.8	-	-	-	-	-	6	24	48	5	*25	22	.0	89	-
4	1	63	-	-	6.5	-	-	-	-	-	6	16	32	5	*25	17	.0	43	-
4	8	63	-	-	7.4	-	-	-	-	-	7	24	40	5	*25	17	.0	59	-
4	15	63	-	-	7.2	-	-	-	-	-	5	28	52	0	*25	20	.0	76	-
5	6	63	-	-	-	-	-	-	-	-	14	32	56	0	*25	23	.0	93	-
5	14	63	-	-	-	-	-	-	-	-	9	32	60	5	*25	20	.2	86	-
5	20	63	-	-	-	-	-	-	-	-	5	28	48	0	*25	22	.0	69	-
6	3	63	-	-	-	-	-	-	-	-	7	42	60	0	*25	21	.0	70	-
6	17	63	-	-	-	-	-	-	-	-	10	34	68	5	*25	22	.0	90	-
6	25	63	-	-	-	-	-	-	-	-	8	36	60	5	*25	24	.0	98	-
7	1	63	30.6	-	-	-	-	-	-	-	7	38	64	0	*25	24	.0	97	10000
7	8	63	24.0	7.1	7.8	-	-	-	-	-	9	46	68	5	*25	26	.0	110	14000
7	15	63	24.0	10.4	7.7	-	-	-	-	-	9	40	80	0	*25	36	.2	94	100
7	23	63	-	-	-	-	-	-	-	-	8	40	76	0	*25	35	.1	97	-
7	29	63	28.0	8.1	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8000
8	5	63	-	-	-	-	-	-	-	-	9	36	58	5	*25	23	.1	72	-
8	12	63	26.0	10.8	8.0	-	-	3.6	-	-	11	40	60	5	*25	25	.1	80	200
8	19	63	22.0	-	8.5	-	-	-	-	-	12	44	70	0	*25	29	.0	113	300
8	26	63	24.0	-	7.2	-	-	-	-	-	10	38	60	0	*25	26	.1	98	100
9	3	63	-	-	-	-	-	-	-	-	9	44	72	0	*25	29	.0	103	-
9	9	63	23.0	12.5	7.8	-	-	-	-	-	8	44	64	0	*25	26	.1	92	180
9	16	63	22.0	9.3	7.3	-	-	-	-	-	9	46	70	0	*25	30	.1	105	1000
9	23	63	18.0	9.2	7.4	-	-	-	-	-	9	38	60	0	*25	26	.1	94	100
9	30	63	20.0	8.2	7.3	-	-	-	-	-	10	40	64	5	*25	29	.1	108	800

736 - 493 O - 64 - 4

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Trenton Water Works Intake
Operated by U.S. Geological Survey

STATE: New Jersey

MAJOR BASIN: North Atlantic

MINOR BASIN: Delaware River-Zone 2

STATION LOCATION: Delaware River at Trenton, New Jersey

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	4.400	6.800	6.840	3.300	6.400	4.520	43.200	8.450	5.510	3.950	3.520	2.420
2	4.040	7.700	6.400	4.000	6.000	5.060	35.900	9.740	5.320	4.450	3.850	2.680
3	3.450	8.600	6.060	4.500	7.000	5.060	30.900	10.200	4.940	3.920	3.550	2.230
4	3.050	11.500	5.820	4.750	7.300	5.580	30.200	9.150	4.750	3.490	4.790	2.300
5	3.210	10.500	5.820	5.000	6.400	9.380	29.100	8.100	4.560	3.060	4.310	2.600
6	4.640	9.200	6.920	4.750	8.400	18.600	25.300	7.350	4.490	2.400	3.620	2.860
7	7.500	8.700	11.000	4.500	8.000	21.900	20.200	6.800	4.560	2.300	2.920	2.650
8	7.500	8.300	13.700	4.100	7.400	17.600	17.100	6.650	4.490	2.450	2.650	2.450
9	6.880	7.800	15.000	4.500	6.000	15.500	15.300	6.060	5.130	2.520	2.700	2.380
10	6.500	12.000	12.400	4.750	6.900	13.200	14.200	6.020	4.980	2.780	2.860	2.140
11	5.980	18.800	11.000	4.630	6.200	14.900	13.200	7.080	4.750	3.270	3.420	2.040
12	5.220	19.600	9.740	5.100	7.000	13.400	12.300	9.050	4.240	3.030	3.390	2.330
13	5.100	18.000	8.250	8.000	7.000	14.800	11.400	8.700	4.060	2.550	2.570	3.250
14	7.020	15.700	6.600	9.200	7.000	13.700	10.200	7.950	4.630	2.570	2.400	2.730
15	7.000	13.500	6.400	8.350	6.500	14.700	9.500	7.550	5.170	2.750	2.810	2.700
16	5.460	11.900	6.600	8.350	6.400	15.500	8.850	7.300	4.980	2.840	2.700	2.470
17	4.660	10.800	6.600	8.200	5.460	18.000	8.300	7.040	5.050	2.950	2.330	2.330
18	4.110	10.200	6.600	7.450	5.340	20.900	7.900	7.040	5.050	2.730	2.180	2.330
19	3.800	10.300	7.200	7.040	5.220	22.900	8.200	10.500	4.830	2.550	2.500	2.550
20	3.310	8.950	7.400	9.150	5.700	27.100	8.450	12.700	4.240	2.980	2.700	2.700
21	3.250	8.800	7.000	11.500	6.100	28.300	8.600	12.200	4.090	3.620	2.750	2.700
22	3.350	11.200	6.500	9.100	5.380	25.100	7.800	10.500	4.560	4.640	2.890	2.730
23	3.250	11.300	6.220	8.450	4.630	21.400	7.800	9.560	4.060	4.750	3.030	2.810
24	3.210	11.300	6.960	8.200	4.660	19.000	7.750	8.500	3.780	4.860	2.810	2.260
25	3.350	11.100	5.660	7.200	4.900	18.600	7.850	7.650	3.520	4.060	2.700	2.000
26	3.420	10.600	5.100	6.600	4.110	23.400	8.250	7.080	3.120	3.520	2.600	2.160
27	3.310	8.950	5.180	6.600	4.190	50.900	7.950	6.700	3.060	3.490	2.010	2.280
28	3.720	8.650	4.630	7.000	4.520	32.700	7.450	6.400	3.000	3.300	2.000	2.260
29	3.660	7.850	4.820	6.000		64.900	6.700	6.300	3.000	3.210	1.970	2.650
30	3.080	7.120	4.940	5.400		53.300	6.500	6.220	3.550	2.660	1.930	3.650
31	3.520		3.500	7.100		48.500		6.140		2.730	2.350	

DELAWARE RIVER AT MARTINS CREEK, PENNSYLVANIA

This sampling point is at the intake of the Martins Creek Steam Electric Generating station of the Pennsylvania Power and Light Company on the west bank approximately 11 miles upstream from Easton, Pennsylvania.

Station Location: Delaware River at Martins Creek, Pennsylvania

Major Basin: North Atlantic

Minor Basin: Delaware-Lehigh River

Station at: 40°48' Latitude 75°06' Longitude

Miles above mouth: 197

Activation Date: November 19, 1957

Sampled by: Pennsylvania Power and Light Company

Field Analysis by: Pennsylvania Power and Light Company

Other Cooperating Agencies: Pennsylvania State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: at Belvidere, New Jersey

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 4,535 square miles

Period of record: 1922 to present

Average discharge in record period: 8,119 cfs. (unadjusted)

Maximum discharge in record period: 273,000 cfs.

Minimum discharge in record period: 609 cfs.

Remarks: Flows affected by operations of power plants on tributaries, upstream lakes and reservoirs. Upstream diversions from Pepacton and Neversink Reservoirs for New York City municipal supply.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
2-27-63	0.06
3- 6-63	0.05
3-13-63	0.06
3-20-63	0.07
3-27-63	0.03
4- 3-63	0.02
4-17-63	0.02
4-24-63	0.03
5- 1-63	0.05
5- 8-63	0.03
5-15-63	0.04
5-22-63	0.04
5-29-63	0.03
6- 5-63	0.03
6-12-63	0.04
6-19-63	0.04
7- 3-63	0.06
7-10-63	0.01
7-17-63	0.04
7-24-63	0.04
7-31-63	0.03
8- 7-63	0.06
8-14-63	0.04
8-21-63	0.06
8-28-63	0.03
9- 4-63	0.04
9-11-63	0.02
9-25-63	0.05

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.10	.05
	Na	6.0	3.1
	K	1.3	.8
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	49	115
	Cd	1	3
	As	10	*10
	B	15	15
	P	72	*5
	Fe	195	24
	Mo	11	*3
	Mn	5	*1
	Al	—	12
	Be	*.02	*.03
	Cu	42	44
	Ag	*.1	*.3
	Ni	40	16
	Co	*1	*1
	Pb	3	*3
	Cr	5	*3
	V	*1	*5
	Ba	3	26
	Sr	39	23

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.2	.2	April to June	1.7	.4
January to March	—	—	July to September	—	—

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-LEHIGH RIVERS

STATION LOCATION DELAWARE RIVER AT MARTINS CREEK, PENNSYLVANIA 61

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												DATE OF DETERMINATION	RADIOACTIVITY IN PLANKTON			
					ALPHA						BETA							GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	3	62	11	2	-	-	-	-	-	-	2	6	4	6	6	8					
10	10	62	11	7	-	-	-	-	-	-	11	5	13	5	24	7					
10	17	62	12	17	-	-	-	-	-	-	8	4	10	6	18	7					
10	24	62	11	16	-	-	-	-	-	-	3	5	20	6	23	7					
10	31	62	11	26	-	-	-	-	-	-	21	3	37	3	58	4					
11	28	62	12	12*	0	1	0	1	0	1	7	6	23	6	30	8					
12	26	62	1	18*	0	0	0	0	0	0	4	6	15	6	19	8					
1	30	63	2	19*	0	0	0	0	0	0	8	6	13	6	21	8					
2	27	63	3	28*	0	0	0	0	0	0	6	6	11	6	17	8					
3	26	63	4	16*	0	1	0	1	0	1	39	8	21	6	60	10					
4	24	63	5	22*	0	1	0	1	0	1	5	6	18	6	23	8					
5	29	63	6	19*	0	0	0	0	0	0	7	6	22	6	29	8					
6	28	63	7	24*	0	0	0	0	0	0	5	5	17	8	22	9					
7	31	63	8	23*	0	1	0	0	0	1	10	6	20	6	30	8					
8	28	63	9	25*	0	1	0	1	0	1	6	5	23	6	29	8					
9	23	63	10	31*	0	1	0	1	0	1	2	6	9	6	11	8					

PLANKTON POPULATION

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-LEHIGH RIVERS

STATION LOCATION DELAWARE RIVER AT MARTINS CREEK, PENNSYLVANIA 061

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See last for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Identify/table) Number per ml.	ROTIFERS										CRUSTACEA								NEMATODES (Identify/table) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														GENERA AND COUNT LEVEL (See last for Codes)										GENERA AND COUNT LEVEL (See last for Codes)									
														NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	54	18	2	17	46	11	16	11	43	0	0	3									3	50	1					0	0
10	15	62	64	14	70	13	92	8	2	8	57	0	0	0									0							0	0
11	5	62	64	16	92	15	16	13	46	8	48	0	0	6									0							0	0
11	19	62	64	23	92	12	2	9	16	6	50	20	0	0									0							0	0
12	3	62										20	0	3									0							0	0
12	17	62	92	18	64	17	70	6	36	5	59	0	0	1									0							0	0
1	7	63	92	32	14	2	31	12	36	4	25	0	0	1									2							0	0
1	28	63	92	28	14	23	62	7	36	6	36	0	0	0									0							0	0
2	4	63	14	26	93	25	92	7	31	7	35	0	0	0									0							0	0
2	18	63	14	28	92	17	36	8	2	6	41	0	0	0									0							0	0
3	4	63	14	59	93	13	92	10	71	2	16	0	-	1									0							0	0
3	18	63	92	32	14	19	93	15	33	6	28	0	-	0									0							0	0
4	1	63	31	13	92	12	93	12	16	10	53	0	-	1									0							0	0
4	15	63	93	15	31	14	92	12	2	8	51	0	-	0									0							1	0
5	6	63	92	49	82	24	31	7	27	2	18	-	-	-									-							-	-
5	20	63	92	26	31	11	2	11	82	10	42	-	-	-									-							-	-
6	3	63	82	40	31	12	92	9	64	6	33	-	-	-									-							-	-
6	17	63	27	16	31	12	92	11	70	6	55	-	-	-									-							-	-
7	1	63	82	19	31	13	92	13	2	8	47	0	-	-									-							-	-
7	15	63										-	-	-									-							-	-
8	5	63	92	8	16	8	93	6	2	5	73	-	-	-									-							-	-
8	19	63										-	-	-									-							-	-
9	4	63										-	-	-									-							-	-
9	16	63										-	-	-									-							-	-

PLANKTON POPULATION

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-LEHIGH RIVERS

STATION LOCATION DELAWARE RIVER AT MARTINS CREEK, PENNSYLVANIA 61

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	700	0	40	60	0	60	0	40	540	40	80	87	1																		
10	15	62	1700	0	0	230	0	100	0	170	1200	40	210	88	1	87	1	38	1														
11	5	62	400	0	0	60	0	0	0	40	330	120	0																				
11	19	62	100	0	0	0	0	0	0	30	80	20	60																				
12	3	62	200	0	0	0	0	20	0	0	170	0	60																				
12	17	62	900	40	40	0	0	0	0	0	790	20	250	92	1	87	1																
1	7	63	200	0	0	0	0	0	0	20	180	0	110																				
1	28	63	300	0	40	0	0	0	0	20	200	20	130																				
2	4	63	400	0	20	0	0	0	0	0	400	0	310																				
2	18	63	200	0	0	0	0	0	0	0	200	0	0																				
3	4	63	500	0	0	0	0	0	0	0	460	0	330	97	1																		
3	18	63	2400	0	0	60	0	20	20	60	2270	210	1810	92	3	97	2																
4	1	63	300	0	0	0	0	20	0	0	290	0	110																				
4	15	63	300	0	20	0	0	40	0	20	200	0	310																				
5	6	63	2100	0	0	80	0	80	60	950	900	60	190	71	3	92	3																
5	20	63	1100	0	0	80	0	0	0	130	840	0	920	92	1																		
6	3	63	2200	0	0	1030	0	40	40	840	210	110	460	71	3	44	2	38	2	26	1												
6	17	63	7600	1070	1260	2520	0	170	20	1450	1110	130	1090	88	4	68	4	17	3	3	3	26	3	44	2	38	1	92	1	81	1	25	1
7	1	63	3300	20	0	1920	0	200	20	270	880	50	810	38	3	71	1	25	1	51	1	37	1	92	1	81	1						
7	15	63	300	0	0	190	0	20	0	40	20	0	40																				
8	5	63	200	0	0	40	0	0	0	80	40	20	190																				
8	19	63	500	70	0	220	0	0	0	0	200	30	470	38	1																		
9	4	63	200	0	0	20	0	0	0	110	20	240	130																				
9	16	63	500	0	20	90	0	20	0	20	310	20	110																				

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE: PENNSYLVANIA
MAJOR BASIN: NORTH ATLANTIC
MINOR BASIN: DELAWARE-LEHIGH RIVERS
STATION LOCATION: DELAWARE RIVER AT MARTINS CREEK, PENNSYLVANIA 61

DATE OF SAMPLE BEGINNING			DATE OF SAMPLE END		GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
											NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	5	62	10	22	7270	124	50	74	1	15	14	1	1	12	0	6	4	1	9
11	8	62	11	29	6580	177	42	135	1	11	15	1	1	12	1	6	3	0	6
11	30	62	12	14	4070	239	48	191	1	15	14	2	2	10	0	5	3	1	9

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-LEHIGH RIVERS

STATION LOCATION DELAWARE RIVER AT MARTINS CREEK, PENNSYLVANIA 61

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (Platinum cobalt units)	TURBIDITY (Silica units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	3	62	15.2	8.7	7.4	.6	12	.9	2.2	.2	3	21	16	14	15	11	.0	53	-
10	10	62	15.6	8.2	7.5	8.0	-	1.2	3.1	.2	4	19	30	27	29	11	.0	54	-
10	17	62	16.6	8.2	7.5	.5	13	1.8	3.8	.2	4	20	30	33	34	16	-	55	-
10	24	62	12.6	8.9	7.7	1.2	14	-	2.4	.2	4	22	34	10	23	13	.0	58	1300
10	31	62	9.4	9.9	6.9	.5	11	.9	2.2	.1	4	19	30	9	14	11	.1	54	2300
11	7	62	5.6	11.4	7.6	.6	16	1.0	2.9	.2	4	19	32	17	25	13	.0	52	220
11	14	62	6.4	10.8	7.3	.6	16	1.4	4.2	.3	3	23	26	23	44	10	.1	45	460
11	21	62	5.4	11.6	7.4	1.0	17	1.1	-	.2	3	19	30	10	22	12	.1	50	6500
11	28	62	3.4	12.5	7.6	.7	17	1.1	2.9	.2	4	12	30	17	21	12	.1	50	5200
12	5	62	4.2	12.1	7.3	.5	12	1.0	2.7	.1	5	20	30	15	21	14	.0	55	960
12	12	62	.0	13.2	7.4	1.1	13	1.2	3.2	.2	2	13	28	15	39	11	.1	47	2300
12	19	62	1.2	13.0	7.5	-	12	1.1	2.5	.2	4	17	28	9	21	13	.0	43	160
12	26	62	.6	12.6	7.7	.8	12	1.0	2.6	.2	4	20	30	10	25	15	.0	57	1400
1	2	63	.6	12.8	7.7	.8	10	.7	2.6	.1	4	16	40	10	18	15	-	68	180
1	9	63	1.0	12.1	7.5	.9	13	1.0	2.3	.1	4	22	28	13	17	13	.0	59	-
1	16	63	.4	13.2	7.3	1.1	13	1.0	2.9	.1	4	18	24	15	22	14	.0	54	-
1	23	63	1.8	13.1	7.4	.4	15	1.0	2.8	.2	4	16	30	15	22	12	.0	58	-
1	30	63	.4	13.5	7.4	.2	12	.8	2.2	.1	4	19	30	17	18	-	.0	59	-
2	6	63	.8	13.4	7.3	1.3	12	1.0	2.5	-	4	15	26	-	-	-	-	54	-
2	13	63	.8	12.6	7.4	.5	13	1.0	2.6	.1	4	21	24	14	15	17	-	60	-
2	20	63	2.0	13.1	7.2	1.1	11	1.4	2.7	.1	4	15	26	15	17	13	-	63	-
2	27	63	.8	13.2	7.3	.2	14	1.7	-	.1	5	23	28	17	18	12	-	62	-
3	6	63	2.2	12.9	7.5	1.0	16	1.9	3.9	.3	5	24	35	22	23	13	-	66	-
3	13	63	2.5	12.7	7.1	1.6	15	1.7	3.7	.3	5	21	24	19	41	17	.2	67	1700
3	20	63	1.8	12.6	6.8	1.3	17	1.6	4.2	.4	5	11	16	19	41	10	-	48	-
3	27	63	4.4	11.6	7.0	2.2	-	1.7	4.8	.4	2	7	12	21	355	9	.1	36	-
4	3	63	8.6	11.2	7.1	.4	17	1.5	3.8	.2	3	8	10	14	39	9	.1	36	120
4	10	63	7.8	10.8	7.3	.8	12	1.3	2.9	.2	4	11	18	11	29	9	.0	41	-
4	17	63	11.6	10.4	7.4	.9	10	1.0	1.9	.2	4	18	20	10	19	10	.0	51	120
4	24	63	11.0	10.6	7.8	1.0	-	1.5	2.5	.3	4	17	28	14	22	11	.0	50	160
5	1	63	12.0	10.0	7.7	1.4	15	.7	1.9	.1	4	21	32	10	23	15	.0	55	1200
5	8	63	16.6	8.6	7.6	1.5	16	1.0	2.3	.2	3	19	28	11	22	12	.2	50	290
5	15	63	15.6	8.9	7.4	1.5	-	1.3	2.9	-	4	21	24	16	30	12	.0	52	-
5	22	63	16.0	8.6	7.3	1.5	18	1.3	2.9	.3	2	16	28	17	34	10	.0	43	330
5	29	63	16.4	9.2	7.4	.8	14	.9	-	.2	1	16	30	10	29	11	.2	50	900
6	5	63	20.8	8.1	7.4	1.4	18	1.3	-	.2	4	23	32	12	38	11	.1	56	430
6	12	63	20.8	8.1	7.5	1.2	17	.9	2.6	.2	2	22	32	14	35	10	.1	56	1400
6	19	63	20.8	8.4	7.5	1.3	16	1.3	3.3	.2	4	20	28	14	38	9	-	53	330

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN DELAWARE-LEHIGH RIVERS
STATION LOCATION DELAWARE RIVER AT
MARTINS CREEK, PENNSYLVANIA 61

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	24	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	290
6	26	63	23.8	7.8	7.8	1.4	14	1.5	3.5	.2	4	23	34	14	35	11	–	55	–
7	3	63	27.2	7.2	7.7	1.1	15	1.0	–	.2	4	21	30	12	42	11	–	51	2400
7	8	63	22.8	7.6	7.4	1.1	17	1.0	2.8	.1	4	22	34	10	42	10	.1	57	–
7	10	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300
7	17	63	25.0	7.6	7.8	.8	–	.8	2.8	.2	4	24	32	13	29	10	.1	56	10
7	24	63	24.2	7.2	7.6	1.6	13	1.3	3.4	.2	4	19	28	19	34	9	.2	48	190
7	31	63	27.6	6.9	7.8	1.1	16	1.5	3.2	.2	5	23	32	10	25	10	.0	63	280
8	7	63	25.0	7.1	7.6	1.2	17	2.4	4.6	.2	5	22	24	20	42	8	.1	60	150
8	14	63	23.4	6.9	–	.8	15	1.7	3.3	.2	4	–	30	14	29	10	.0	59	10000
8	21	63	23.8	7.7	–	.7	12	1.6	3.0	.2	4	–	30	13	24	10	.1	53	1900
8	28	63	23.8	8.0	8.0	1.4	–	.8	2.1	.2	5	21	30	13	25	11	.1	57	–
9	4	63	23.4	7.6	7.7	.6	–	.5	1.5	.2	5	20	30	8	20	12	–	55	500
9	11	63	21.0	8.1	7.9	.7	12	1.0	2.3	.1	4	20	28	8	18	10	–	53	390
9	18	63	18.2	8.6	7.8	.4	19	1.4	3.2	.3	4	20	30	8	13	9	–	55	800
9	25	63	14.4	9.5	7.8	.4	–	1.1	2.3	.2	4	–	32	9	18	8	.1	51	4300

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Belvidere, New Jersey
Operated by U.S. Geological Survey

STATE: Pennsylvania

MAJOR BASIN: North Atlantic

MINOR BASIN: Delaware-Lehigh Rivers

STATION LOCATION: Delaware River at Martins Creek, Pennsylvania

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	2.090	4.410	3.800	2.000	3.780	2.870	28.600	6.360	3.610	3.440	2.460	1.990
2	1.820	5.760	3.590	2.270	3.830	2.870	25.500	7.480	3.280	3.000	2.180	1.520
3	1.690	5.400	3.470	2.180	4.180	2.910	23.800	7.100	2.980	2.700	3.660	1.500
4	1.870	5.400	3.420	3.150	3.440	2.480	24.500	6.030	2.870	2.180	3.300	1.620
5	2.040	5.020	3.230	3.000	3.710	2.790	23.400	5.460	2.850	1.480	2.620	2.090
6	2.760	5.220	3.880	2.930	4.710	4.570	18.300	5.040	2.870	1.520	1.970	1.800
7	3.760	5.130	7.100	2.540	4.710	6.030	14.500	4.850	3.020	1.510	1.750	1.740
8	4.250	4.820	10.700	2.350	4.000	6.240	12.400	4.380	3.610	1.700	1.940	1.660
9	3.300	4.540	9.060	2.870	3.900	6.330	11.400	4.180	3.400	2.040	2.220	1.410
10	2.980	6.010	7.600	2.760	3.920	6.270	10.500	4.570	3.190	2.560	2.760	1.420
11	2.520	9.580	6.820	2.600	3.400	6.420	9.700	5.730	2.910	2.250	2.620	1.780
12	2.580	10.800	5.460	2.910	3.420	6.690	8.860	5.880	2.760	1.770	1.660	1.600
13	4.340	10.700	3.940	4.230	3.970	7.420	7.640	5.640	3.230	1.780	1.560	1.570
14	5.130	9.500	3.320	4.410	3.710	7.880	7.060	5.340	3.850	1.920	1.660	1.990
15	3.590	8.360	3.780	5.100	3.590	8.610	6.600	4.990	3.540	2.000	1.890	1.720
16	2.910	7.300	3.880	5.700	3.260	9.980	6.030	4.960	3.660	2.070	1.480	1.440
17	2.500	6.540	3.350	5.130	3.230	11.600	5.640	4.850	3.850	1.900	1.450	1.460
18	2.270	6.270	3.900	4.620	2.740	13.100	5.760	5.760	3.710	1.690	1.890	1.800
19	1.900	5.280	4.510	4.490	2.870	15.600	6.060	7.960	3.210	2.130	1.770	1.940
20	1.920	5.100	4.490	4.960	3.280	18.100	6.360	9.140	2.930	2.420	1.900	2.020
21	2.020	4.880	3.660	5.460	3.350	18.100	5.760	7.920	3.260	3.540	2.110	2.090
22	1.950	4.930	3.190	4.880	2.910	15.800	5.760	6.840	3.020	3.350	2.180	2.110
23	1.990	6.180	3.900	5.640	2.950	13.900	5.760	6.240	2.760	3.540	2.060	1.500
24	2.160	6.720	3.020	5.070	2.870	12.900	5.820	5.610	2.560	2.980	2.020	1.320
25	2.090	6.600	2.850	4.070	2.500	14.000	6.300	5.040	2.250	2.680	1.870	1.600
26	2.160	5.520	3.190	4.230	2.500	22.300	6.360	4.570	2.200	2.680	1.380	1.600
27	2.620	5.340	2.810	4.230	3.150	55.200	5.940	4.310	2.090	2.460	1.390	1.630
28	2.310	4.930	3.020	3.370	3.000	65.700	5.100	4.310	2.130	2.310	1.270	1.720
29	1.770	4.330	3.040	3.300		48.700	4.710	4.200	2.360	1.890	1.300	1.970
30	1.870	4.000	2.460	4.120		39.700	4.900	4.280	2.870	1.690	1.770	2.180
31	3.300		1.920	4.230		32.700		3.710		2.460	1.820	

POTOMAC RIVER AT WASHINGTON, D.C.

This station is in the east hoist room of Arlington Memorial Bridge on U.S. Highway 50. The Potomac River estuary at this point has an average tidal range of about 4 feet. The water is still fresh with from about 6 to 30 mg/l chloride.

In the summer of 1963, an electronic water quality monitor was installed to enable continuous recording of water temperature, pH, dissolved oxygen, specific conductance and chloride, and solar radiation intensity.

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Station Location:	Potomac River at Washington, D.C.
Major Basin:	North Atlantic
Minor Basin:	Potomac River
Station at:	38°53' Latitude 77°03' Longitude
Miles above mouth:	97
Activation Date:	July 15, 1963
Sampled by:	District of Columbia Department of Sanitary Engineering
Field Analysis by:	District of Columbia Department of Sanitary Engineering
Other Cooperating Agencies:	Department of Interior, National Park Service
Hydrologic Data:	District of Columbia Dept. of Public Health
Nearest pertinent gaging station:	near Washington, D. C.
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	11,560 square miles (adjusted)
Period of record:	1930 to present
Average discharge in record period:	11,120 cfs.

Maximum discharge in record period: 484,000 cfs.

Minimum discharge in record period: 448 cfs.

Remarks: Diversion above gaging station for District of Columbia municipal supply. Average discharge adjusted for diversion.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval	
Analysis by wet or flame methods. Results in mg/l	F		
	Na		
	K		
Analysis by Spectrographic methods. Results in micrograms per liter	Zn		
	Cd		
	As		
	B		
	P		
	Fe		
	Mo		
	Mn		
	Al		
	Be		
	Cu		
	Ag		
	Ni		
	Co		
	Pb		
	Cr		
	V		
	Ba		
	Sr		

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	—	—	April to June	—	—
January to March	—	—	July to September	3.4	.3

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
7/16 - 7/23/63	Nitrile	
7/16 - 7/23/63	Amine	
9/17 - 9/24/63	Nitrile	
9/17 - 9/24/63	Amine	

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

See page 21.

RADIOACTIVITY DETERMINATIONS

STATE DISTRICT OF COLUMBIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WASHINGTON, D C

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION		ALPHA						BETA				DATE OF DETERMINATION		GROSS ACTIVITY		
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
7	17	63	8	7	0	1	0	1	0	1	0	7	32	8	32	11						
7	23	63	8	7	0	0	0	1	0	1	2	6	27	8	29	10						
7	30	63	8	14	0	0	0	1	0	1	1	6	23	8	24	10						
8	7	63	8	21	0	0	0	1	0	1	1	6	25	8	26	10						
8	13	63	8	23	0	0	0	1	0	1	2	6	26	8	28	10						
8	20	63	9	6	0	1	0	1	0	1	47	8	37	8	84	11						
8	27	63	9	16	0	1	0	1	0	1	6	3	35	4	41	5						
9	3	63	9	20	0	0	1	1	1	1	0	14	30	7	30	16						
9	10	63	10	2	0	0	1	1	1	1	6	5	22	8	28	9						
9	17	63	10	4	0	0	1	1	1	1	2	5	34	9	36	10						
9	24	63	10	10	0	0	1	2	1	2	1	6	23	9	24	11						

PLANKTON POPULATION

STATE DISTRICT OF COLUMBIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WASHINGTON, D C

130

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																							
			1ST		2ND		3RD		4TH				PROTOZOA (Flagellates) (Number per ml.)	ROTIFERS												CRUSTACEA									NEMATODES (Adults/Juveniles) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
7	17	63	27	70	26	19	82	5			6																									
9	3	63																																		
9	17	63																																		

PLANKTON POPULATION

STATE DISTRICT OF COLUMBIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT
WASHINGTON, D C 130

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
7	17	63	4300	20	20	1720	0	0	0	2340	230	1570	190	68	3	38	3	26	1	29	1	37	1										
9	3	63	1600	20	20	480	0	70	0	690	340	540	90	38	1	69	1																
9	17	63	500	0	0	270	0	20	0	110	70	70	50																				

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE DISTRICT OF COLUMBIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WASHINGTON, D C

130

DATE OF SAMPLE BEGINNING MONTH	BEGINNING DAY	BEGINNING YEAR	END MONTH	END DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	EXTRACTABLES CHLOROFORM	EXTRACTABLES ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	CHLOROFORM EXTRACTABLES WATER SOLUBLES	CHLOROFORM EXTRACTABLES NEUTRALS TOTAL	NEUTRALS ALIPHATICS	NEUTRALS AROMATICS	NEUTRALS OXYGENATED COMPOUNDS	NEUTRALS LOSS	CHLOROFORM EXTRACTABLES WEAK ACIDS	CHLOROFORM EXTRACTABLES STRONG ACIDS	CHLOROFORM EXTRACTABLES BASES	CHLOROFORM EXTRACTABLES LOSS
7	16	63	7	23	4382	220	110	110	6	34	28	1	2	22	3	11	6	3	22
8	13	63	8	20	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	17	63	9	24	4525	203	83	120	3	24	31	2	5	23	1	8	6	2	9

* FLOW UNKNOWN

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE DISTRICT OF COLUMBIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WASHINGTON, D C 130

DATE OF SAMPLE MONTH	DAY	YEAR	TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND 1-HOUR mg/l	CHLORINE DEMAND 24-HOUR mg/l	AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
7	17	63	-	-	-	2.2	-	-	-	-	14	72	112	5	*25	52	.0	147	-
7	23	63	28.9	4.5	7.3	2.8	-	-	-	.7	15	80	112	10	*25	49	.0	170	-
7	30	63	29.1	3.6	8.3	1.5	-	-	-	.5	18	84	114	0	*25	36	.0	179	29000
8	7	63	27.5	5.0	7.3	.8	32	-	-	.6	8	86	110	0	*25	42	.0	171	100
8	13	63	27.2	7.3	7.3	2.4	32	-	-	.7	15	84	114	0	*25	53	.0	194	1000
8	20	63	24.2	6.5	7.1	4.2	35	-	-	.7	17	76	112	0	*25	53	.0	190	43000
8	27	63	23.5	6.1	7.2	.6	36	-	-	.7	14	64	90	5	*25	47	.0	167	20000
9	3	63	24.4	6.2	7.2	1.9	23	-	-	.6	16	84	120	5	*25	57	.0	200	-
9	10	63	23.8	7.1	7.0	4.0	19	-	-	.4	18	86	130	0	*25	58	.0	230	7000
9	17	63	21.5	6.1	7.4	2.2	50	1.2	5.2	.6	22	88	144	5	*25	72	.0	240	100000
9	24	63	19.5	7.7	7.7	2.1	24	.7	4.5	.4	24	100	144	0	*25	80	.0	280	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Washington, D.C.
Operated by U.S. Geological Survey

STATE: District of Columbia

MAJOR BASIN: North Atlantic

MINOR BASIN: Potomac River

STATION LOCATION: Potomac River at Washington, D.C.

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1.400	1.500	4.600	3.000	8.000	4.650	15.200	6.660	3.550	3.010	1.290	1.120
2	1.500	1.730	4.300	3.000	8.000	4.700	14.400	6.780	3.590	3.010	1.400	1.080
3	1.650	2.040	4.250	3.500	8.000	6.000	13.600	7.080	4.600	2.760	1.290	1.000
4	1.880	2.310	4.010	4.000	8.000	9.800	13.000	7.260	7.500	2.590	1.220	.925
5	1.880	2.970	3.640	4.500	7.260	18.900	12.800	6.840	8.260	2.890	1.150	1.120
6	1.920	3.150	4.010	4.500	6.900	67.300	11.000	6.420	15.000	3.010	1.150	1.270
7	2.550	2.840	5.460	4.000	6.420	108.000	10.200	6.000	17.400	2.930	1.070	1.270
8	2.390	2.590	6.960	4.000	6.120	89.000	9.590	5.760	14.600	3.280	.961	1.230
9	2.310	2.430	6.540	4.000	5.340	56.500	9.040	5.460	14.600	2.840	.925	1.160
10	2.310	3.870	5.760	4.010	4.900	39.800	8.710	5.070	11.600	2.470	.890	1.190
11	2.310	6.060	5.070	4.110	5.120	31.000	8.380	4.700	9.380	2.230	.823	1.350
12	2.190	10.700	3.920	5.940	5.520	31.700	8.190	4.450	8.260	2.070	.823	1.550
13	2.040	16.400	3.000	15.900	5.180	36.900	7.860	4.160	7.930	1.960	.998	1.430
14	1.850	12.600	3.000	49.700	5.520	73.700	7.380	3.920	11.200	2.000	1.350	1.310
15	1.770	8.720	3.460	44.100	5.120	87.200	6.900	3.870	9.940	2.000	1.150	1.190
16	1.690	6.480	3.550	28.700	8.120	62.200	6.660	3.870	7.740	1.920	1.040	1.190
17	1.610	5.400	3.920	20.200	7.620	46.600	6.420	3.730	6.480	1.710	.961	1.160
18	1.580	4.800	3.920	16.600	5.340	43.500	6.300	4.400	5.520	1.670	.998	1.040
19	1.500	4.960	3.730	12.700	4.960	48.500	6.120	5.340	4.960	1.590	.890	.964
20	1.440	6.600	3.500	11.300	5.760	57.100	6.060	5.180	4.600	1.630	1.980	.925
21	1.400	8.450	3.400	11.400	7.200	107.000	5.880	5.180	4.700	1.520	5.110	.856
22	1.360	12.200	3.500	10.600	5.580	109.000	6.000	5.520	4.110	1.520	2.290	.823
23	1.300	11.300	3.590	9.100	6.780	58.600	6.300	5.070	3.820	1.520	1.590	.791
24	1.360	10.900	3.500	7.620	7.080	40.300	5.940	4.550	3.410	1.440	1.310	.760
25	1.400	11.100	3.400	6.000	6.480	31.100	5.760	4.210	3.100	1.320	1.190	.730
26	1.400	10.300	3.200	6.000	5.820	26.200	7.020	4.250	3.100	1.150	1.150	.730
27	1.330	8.520	3.200	5.500	5.700	23.100	8.120	4.110	2.930	1.120	1.270	.730
28	1.300	6.840	3.200	5.000	4.750	22.000	7.440	3.820	2.590	1.080	1.390	.760
29	1.300	5.760	3.200	6.000		20.800	6.900	3.590	2.430	1.150	1.470	1.630
30	1.330	4.960	3.200	7.000		18.700	6.780	3.550	3.590	1.320	1.350	1.470
31	1.360		3.150	7.000		16.600		3.590		1.400	1.110	

POTOMAC RIVER AT GREAT FALLS, MARYLAND

This sampling point is approximately 10 miles northwest of the District of Columbia boundary and is at the intake of the Dalecarlia Water Treatment Plant. This 300 million gallons per day plant is operated by the Corps of Engineers to provide municipal supply for the District of Columbia. Recommended criteria set by the Interstate Commission on the Potomac River Basin are as follows: (1) MPN not to exceed 2,000 per 100 ml; (2) monthly median D.O. not less than 6.5 ppm, with a minimum of 4.0 ppm; (3) no floating debris.

Carbon adsorption samples from this station for the period 5/16-5/27/63 showed the presence of nitrile type substances of the type found upstream in the Shenandoah River. The significance of this observation is discussed in connection with the PHS Water Pollution Surveillance System station on the Shenandoah at Berryville, Virginia (page 91.)

Station Location:	Potomac River at Great Falls, Maryland
Major Basin:	North Atlantic
Minor Basin:	Potomac River
Station at:	38°59' Latitude 77°15' Longitude
Miles above mouth:	126
Activation Date:	October 14, 1957
Sampled by:	U.S. Army Corps of Engineers
Field Analysis by:	U.S. Army Corps of Engineers
Other Cooperating Agencies:	Maryland State Department of Health
Hydrologic Data:	
Nearest pertinent gaging station:	Near Washington, D. C.
Gaging station operated by:	U. S. Geological Survey
Drainage area at gaging station:	11,560 square miles
Period of record:	1930 to present
Average discharge in record period:	11,120 cfs.

Maximum discharge in record period: 484,000 cfs.

Minimum discharge in record period: 448 cfs.

Remarks: Gaging station below diversion for District of Columbia municipal supply. Average discharge includes diversion adjustment.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.02	.05
	Na	12	5.7
	K	3.0	1.7
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	11	8
	Cd	*2	2
	As	21	*10
	B	28	23
	P	41	12
	Fe	123	6
	Mo	9	6
	Mn	.8	1.7
	Al	—	46
	Be	*.05	*.03
	Cu	6	9
	Ag	*.4	*.3
	Ni	*1	2
	Co	*4	*2
	Pb	21	3
	Cr	*1	*3
	V	*2	6
	Ba	38	26
	Sr	83	64

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.0	.2	April to June	—	—
January to March	—	—	July to September	2.5	.3

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
10/19 - 10/29/62	Nitrile	
10/19 - 10/29/62	Amine	
11/15 - 11/23/62	Nitrile	
11/15 - 11/23/62	Amine	
12/4 - 12/18/62	Possible Nitrile	
6/14 - 6/26/63	Nitrile	
6/14 - 6/26/63	Amine	
7/9 - 7/30/63	Nitrile	
7/9 - 7/30/63	Amine	
8/13 - 9/4/63	Nitrile	
9/23 - 10/4/63	Nitrile and Amine	

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION POTOMAC RIVER AT GREAT FALLS, MARYLAND 40

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION	ALPHA					BETA								DATE OF DETERMINATION	GROSS ACTIVITY				
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL					ALPHA		BETA		
MO.	DAY	YR.	MO. DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±		MO. DAY	pc/g	±	pc/g	±	
10	1	62	11 29	-	-	-	-	-	-	4	5	8	7	12	8							
10	8	62	11 28	-	-	-	-	-	-	5	5	14	7	19	9							
10	15	62	12 17	0	0	0	1	0	1	3	4	14	5	17	6							
10	22	62	11 15	-	-	-	-	-	-	3	6	16	8	19	10							
10	29	62	11 19	-	-	-	-	-	-	0	6	9	9	9	11							
11	26	62	12 12*	1	1	0	1	1	1	29	7	80	9	109	11							
12	31	62	1 14*	0	0	0	1	0	1	12	3	19	4	31	5							
1	28	63	2 20*	1	1	0	1	1	1	46	10	17	8	63	13							
2	25	63	3 11*	0	1	0	0	0	1	11	5	33	7	44	9							
3	25	63	4 15*	0	1	0	1	0	1	40	4	33	4	73	6							
4	29	63	5 22*	1	1	0	1	1	1	18	6	18	7	36	9							
5	27	63	6 17*	0	1	0	0	0	1	7	3	21	4	28	5							
6	24	63	7 24*	1	1	0	1	1	1	22	6	29	8	51	10							
7	29	63	8 19*	0	0	0	1	0	1	4	3	24	4	28	5							
8	26	63	9 25*	0	1	1	1	1	1	7	5	22	8	29	9							
9	30	63	10 23*	0	1	0	1	0	1	0	16	19	8	19	18							

PLANKTON POPULATION

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT
GREAT FALLS, MARYLAND 040

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Flagellates) (Number per ml.)	ROTIFERS										CRUSTACEA								NEMATODES (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See text for Codes)											GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	27	42	23	36	16	6	26	5	11	-	-	2											0							0	0
10	15	62	23	39	26	13	16	9	64	5	34	10	-	0											0							0	0
11	5	62	82	30	16	11	27	7	23	7	45	40	-	2											0							0	0
11	19	62	92	20	82	14	16	9	26	8	49	-	-	0											0							0	0
12	3	62	16	16	23	7	2	6	82	5	66	540	-	0											0							0	0
12	10	62	2	11	92	11	82	10	62	8	60	130	-	0											0							0	0
1	7	63	82	34	64	10	71	7	51	6	43	-	-	0											0							0	0
1	21	63	82	19	92	16	64	15	51	6	44	-	-	0											0							0	0
2	4	63	93	17	92	10	51	8	64	5	60	-	-	0											0							1	0
2	18	63	92	31	82	20	51	9	31	7	33	-	-	0											0							0	0
3	4	63	36	46	92	32	71	4	88	3	15	-	-	0											0							1	0
3	18	63	92	32	56	17	14	10	65	9	32	-	-	0											0							0	0
4	1	63	92	23	51	8	65	8	16	7	54	-	-	0											0							0	0
4	15	63	92	56	82	21	67	5	36	3	15	-	-	0											1							0	0
5	6	63	27	72	67	18	82	6			4	-	-	-											-							-	-
5	20	63	82	97	26	1	28	1			1	20	-	-											-							-	-
6	3	63	27	62	26	12	23	2	91	2	2	-	-	-											-							-	-
6	17	63	26	35	82	22	27	22	31	3	18	-	-	-											-							-	-
7	1	63	82	52	26	14	27	10	23	7	17	-	-	-											-							-	-
7	15	63	27	74	26	22					4	-	-	-											-							-	-
8	5	63	26	26	23	23	28	13	30	11	27	-	-	-											-							-	-
8	19	63	27	85	26	6	70	2			7	-	-	-											-							-	-
9	2	63	82	18	27	18	26	13	23	13	38	-	-	-											-							-	-
9	16	63																																

PLANKTON POPULATION

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION POTOMAC RIVER AT GREAT FALLS, MARYLAND 40

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	6600	80	130	2030	0	20	0	3970	340	1980	300	68	5	38	3	40	3	26	1	79	1	44	1								
10	15	62	500	10	20	260	0	60	0	120	30	20	0	26	1																		
11	5	62	74400	40	0	1370	0	750	40	71620	620	14080	80	71	9	68	8	51	3	24	2	25	2	38	2	87	1	44	1				
11	19	62	400	40	0	40	20	60	0	0	210	0	40																				
12	3	62	1000	0	0	0	0	0	0	460	580	40	0	68	2	87	1																
12	10	62	300	0	0	20	0	20	20	20	260	110	310																				
1	7	63	00	0	0	0	0	0	0	0	50	0	20																				
1	21	63	200	0	0	0	0	30	0	20	140	20	80																				
2	4	63	100	0	0	0	0	0	0	0	60	0	140																				
2	18	63	100	0	0	0	0	0	10	0	80	30	100																				
3	4	63	6100	0	0	0	0	40	20	0	6070	20	1230	82	5	92	4	91	2	88	1												
3	18	63	400	0	0	0	0	0	0	40	310	0	750																				
4	1	63	100	0	0	0	0	0	0	40	90	20	310																				
4	15	63	3300	0	0	20	0	550	40	920	1720	70	330	92	4	52	2	71	1	88	1												
5	6	63	8300	20	70	460	0	510	0	6360	920	290	350	68	6	88	3	71	2	51	2	26	1										
5	20	63	39300	170	1410	11720	0	780	400	24400	400	590	60	71	8	26	6	17	4	51	3	38	3	24	3	44	2	45	2	62	2	35	1
6	3	63	19300	20	740	10520	0	1490	60	5990	500	1660	80	68	6	44	5	26	5	38	5	51	4	17	3	92	2	44	1				
6	17	63	2700	130	0	650	0	180	0	1450	290	290	110	68	3	71	2	38	2														
7	1	63	4300	50	20	1520	0	630	0	2100	0	410	0	71	4	68	3	25	3	51	3	38	2	69	1								
7	15	63	6100	0	0	2070	0	0	0	3810	250	930	150	68	5	31	3	38	3	29	1												
8	5	63	800	40	0	460	0	0	0	350	0	270	80	68	2																		
8	19	63	3700	0	0	1410	0	130	0	2110	20	440	0	68	4	44	2	38	1	29	1												
9	2	63	400	0	20	180	0	0	0	240	0	90	40	68	1																		
9	16	63	800	20	0	520	0	20	0	180	0	110	110	38	2																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION POTOMAC RIVER AT GREAT FALLS, MARYLAND 40

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
BEGINNING			END								NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	19	62	10	29	4478	211	70	141	1	18	22	1	1	19	1	6	7	2	14
11	15	62	11	23	4249	226	69	157	1	19	22	1	2	18	1	8	5	2	12
12	10	62	12	19	4210	242	103	139	5	29	28	1	2	23	2	9	8	2	22
1	14	63	1	28	4663	208	73	135	6	20	24	1	2	19	2	7	4	2	10
2	11	63	2	21	4682	214	83	131	3	23	28	1	3	21	3	8	5	3	13
3	11	63	3	25	4422	246	87	159	4	23	24	3	2	19	0	10	9	1	16
4	9	63	4	29	4557	150	67	83	3	17	23	2	2	17	2	8	4	1	11
5	16	63	5	27	4020	218	104	114	5	27	27	1	1	23	2	13	10	2	20
6	14	63	6	26	4127	196	98	98	3	22	31	5	5	20	1	16	9	1	16
7	9	63	7	30	3975	248	105	143	5	25	26	1	3	21	1	12	8	2	27
8	13	63	9	4	4268	257	116	141	4	24	27	1	2	24	0	13	13	2	33
9	23	63	10	4	3859	211	79	132	4	23	22	1	1	20	0	9	5	2	14

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT GREAT FALLS, MARYLAND

40

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (cobalt units)	TURBIDITY (silica units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	17.2	8.0	8.4	.8	17	1.9	4.4	.0	17	115	150	5	18	51	.2	243	100
10	8	62	20.6	7.6	8.3	.8	15	2.0	5.3	.1	17	113	140	5	20	51	.1	220	-
10	15	62	20.5	8.0	8.3	.4	14	.9	4.5	.1	25	98	146	5	8	52	.2	235	-
10	22	62	17.2	7.4	8.3	5.0	16	1.3	4.0	.1	18	106	138	5	10	48	.2	230	500
10	29	62	8.8	12.0	8.7	5.0	21	1.8	5.3	.2	19	101	142	5	10	53	.2	238	-
11	5	62	8.3	10.4	8.9	4.2	26	3.8	5.8	.1	15	93	136	-	15	42	.2	197	-
11	13	62	9.4	8.8	7.7	3.4	30	4.4	8.2	.3	16	84	130	-	150	44	.2	222	10000
11	19	62	7.2	8.0	7.8	.2	19	2.6	4.9	.2	6	59	88	20	35	30	.1	134	-
11	26	62	6.1	10.8	7.7	2.0	57	2.6	4.7	.1	8	57	96	10	35	34	.1	155	1700
12	3	62	5.5	11.2	8.0	1.4	17	1.8	4.3	.1	7	60	90	5	18	29	.1	122	100
12	10	62	1.7	11.4	7.8	2.6	20	3.5	6.0	.1	14	51	84	15	45	30	.3	134	1200
12	17	62	.6	13.4	8.0	4.6	16	1.9	4.4	.1	11	68	98	8	14	29	.2	150	200
12	24	62	.6	13.6	8.2	2.6	-	-	-	-	-	83	120	-	10	-	-	-	-
12	31	62	.6	13.4	8.1	1.8	19	1.5	4.4	.1	16	78	122	5	19	38	.2	188	-
1	7	63	.6	15.6	8.0	2.2	16	2.0	4.4	.1	21	80	112	5	9	34	.2	162	-
1	14	63	.6	10.8	7.8	6.0	88	1.7	8.0	.3	10	58	86	12	400	30	.1	154	34000
1	21	63	2.8	11.6	7.8	2.0	18	2.0	4.9	.1	6	39	64	12	34	22	.2	112	-
1	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3500
1	28	63	.6	12.0	7.8	1.2	29	2.0	4.4	.3	8	59	94	-	15	28	.1	157	-
2	4	63	.6	12.4	8.0	2.4	18	1.6	4.1	.3	11	76	106	-	12	29	.1	163	-
2	5	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*50
2	11	63	1.2	12.4	7.8	3.2	19	1.6	7.3	.2	13	69	90	15	22	29	.1	145	-
2	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
2	18	63	.6	13.8	8.2	2.8	16	2.2	6.8	.1	13	73	102	7	19	30	.1	160	-
2	25	63	.6	12.0	8.0	2.6	17	2.1	6.6	.2	11	65	102	14	25	32	.2	164	700
3	4	63	2.3	11.6	7.8	7.8	29	2.4	8.9	.2	11	53	82	18	90	29	.2	134	-
3	5	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3200
3	11	63	3.9	12.2	7.6	3.2	21	2.2	5.6	.1	6	36	56	8	85	23	.1	104	5500
3	18	63	7.7	11.2	7.6	6.5	20	2.4	5.4	.1	7	34	58	8	60	22	.3	100	-
3	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2200
3	25	63	7.2	11.6	7.5	3.9	13	1.6	5.1	.1	13	39	64	6	50	24	.2	94	-
3	26	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4300
4	1	63	12.8	10.2	7.7	1.4	16	1.0	5.1	.1	15	51	76	5	17	24	.2	110	-
4	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3700
4	8	63	15.0	8.6	7.9	1.2	17	1.8	5.5	.1	17	60	90	-	12	27	.2	126	-
4	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500
4	15	63	14.4	9.6	8.7	1.6	12	1.0	3.7	.1	7	66	90	4	9	27	.2	126	-
4	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500
4	22	63	18.9	8.0	8.4	2.0	17	1.4	4.1	.1	7	70	102	5	8	35	.0	170	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT GREAT FALLS, MARYLAND 40

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
4	29	63	17.2	9.4	8.6	2.0	17	2.1	4.6	.0	11	71	106	5	10	35	.0	180	-
5	6	63	20.6	8.0	8.5	1.8	19	1.4	4.0	.1	8	64	96	-	10	26	.1	165	-
5	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8000
5	13	63	21.0	6.8	8.7	1.2	15	2.0	4.9	.1	13	69	102	-	12	34	.1	144	-
5	20	63	19.4	7.0	8.6	3.2	18	2.1	5.4	.1	16	70	96	5	10	31	.1	148	-
5	21	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4500
5	27	63	19.4	8.4	9.0	4.1	30	1.9	5.3	.0	13	70	98	5	20	35	.0	150	-
6	3	63	19.4	5.6	8.3	3.9	18	-	-	.1	13	69	86	5	18	40	.3	154	-
6	10	63	18.0	5.6	7.7	.6	22	3.4	7.8	.1	16	41	56	23	100	26	.3	105	1500
6	11	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1500
6	17	63	20.0	6.6	7.7	1.2	15	3.2	7.2	.2	3	55	82	-	25	29	.5	140	-
6	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000
6	24	63	20.5	8.4	9.3	5.0	26	3.1	5.8	.1	7	61	84	10	23	32	.5	122	-
6	25	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200
7	1	63	23.9	3.6	7.9	.6	16	3.1	7.9	.1	14	56	78	8	25	34	.1	160	-
7	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3700
7	8	63	22.2	5.6	8.5	2.4	20	2.6	8.8	.1	9	75	108	7	16	37	.1	164	-
7	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	580
7	15	63	24.4	5.4	7.9	1.4	19	2.6	7.4	.1	10	72	104	8	15	42	.0	162	-
7	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
7	22	63	21.7	3.0	8.0	-	18	2.2	7.1	.1	18	62	116	5	17	51	.1	195	-
7	23	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000
7	29	63	23.3	4.6	7.9	2.2	19	3.6	9.4	.3	13	85	112	5	6	39	.1	172	-
7	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
8	5	63	21.8	5.6	8.2	1.4	17	2.1	6.1	.2	14	86	120	6	15	50	.1	191	-
8	6	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#50
8	12	63	21.1	4.2	8.2	.4	19	3.0	6.5	.2	18	85	128	5	9	53	.1	218	-
8	13	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#50
8	19	63	20.6	7.2	8.4	1.2	15	1.7	5.6	.2	25	79	122	5	12	60	.1	213	-
8	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3000
8	26	63	20.0	6.6	7.9	1.4	17	2.5	6.3	-	20	88	116	7	15	50	.1	205	-
8	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
9	2	63	21.1	6.8	-	1.0	-	-	-	-	-	84	130	8	19	65	.1	233	-
9	9	63	20.6	7.4	8.3	2.4	21	2.6	6.6	.2	23	93	142	7	32	62	.1	226	-
9	16	63	17.8	7.2	8.2	.4	19	1.7	5.2	.1	28	98	142	5	15	84	.1	268	-
9	17	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
9	23	63	18.3	9.0	8.3	2.0	14	2.3	5.6	.1	24	93	140	5	9	80	.1	240	-
9	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
9	30	63	17.8	8.2	8.0	5.2	19	1.1	5.8	.1	20	71	112	7	35	70	.1	200	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Washington, D.C.
Operated by U.S. Geological Survey

STATE Maryland

MAJOR BASIN North Atlantic

MINOR BASIN Potomac River

STATION LOCATION Potomac River at Great Falls, Maryland

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1.400	1.500	4.600	3.000	8.000	4.650	15.200	6.660	3.550	3.010	1.290	1.120
2	1.500	1.730	4.300	3.000	8.000	4.700	14.400	6.780	3.590	3.010	1.400	1.080
3	1.650	2.040	4.250	3.500	8.000	6.000	13.600	7.080	4.600	2.760	1.290	1.000
4	1.880	2.310	4.010	4.000	8.000	9.800	13.000	7.260	7.500	2.590	1.220	.925
5	1.880	2.970	3.640	4.500	7.260	18.900	11.800	6.840	8.260	2.890	1.150	1.120
6	1.920	3.150	4.010	4.500	6.900	67.300	11.000	6.420	15.000	3.010	1.150	1.270
7	2.550	2.840	5.460	4.000	6.420	108.000	10.200	6.000	17.400	2.930	1.070	1.270
8	2.390	2.590	6.960	4.000	6.120	89.000	9.590	5.760	14.600	3.280	.961	1.230
9	2.310	2.430	6.540	4.000	5.340	56.500	9.040	5.460	14.600	2.840	.925	1.160
10	2.310	3.870	5.760	4.010	4.900	39.800	8.710	5.070	11.600	2.470	.890	1.190
11	2.310	6.060	5.070	4.110	5.120	31.000	8.380	4.700	9.380	2.230	.823	1.350
12	2.190	10.700	3.920	5.940	5.520	31.700	8.190	4.450	8.260	2.070	.823	1.550
13	2.040	16.400	3.000	15.900	5.180	36.900	7.860	4.160	7.930	1.960	.998	1.430
14	1.850	12.600	3.000	49.700	5.520	73.700	7.380	3.920	11.200	2.000	1.350	1.310
15	1.770	8.720	3.460	44.100	5.120	87.200	6.900	3.870	9.940	2.000	1.150	1.190
16	1.690	6.480	3.550	28.700	8.120	62.200	6.660	3.870	7.740	1.920	1.040	1.190
17	1.610	5.400	3.920	20.200	7.620	46.600	6.420	3.730	6.480	1.710	.961	1.160
18	1.580	4.800	3.920	16.600	5.340	43.500	6.300	4.400	5.520	1.670	.998	1.040
19	1.500	4.960	3.730	12.700	4.960	48.500	6.120	5.340	4.960	1.590	.890	.964
20	1.440	6.600	3.500	11.300	5.760	57.100	6.060	5.180	4.600	1.630	1.980	.925
21	1.400	8.450	3.400	11.400	7.200	107.000	5.880	5.180	4.700	1.520	5.110	.856
22	1.360	12.200	3.500	10.600	5.580	109.000	6.000	5.520	4.110	1.520	2.290	.823
23	1.300	11.300	3.590	9.100	6.780	58.600	6.300	5.070	3.820	1.520	1.590	.791
24	1.360	10.900	3.500	7.620	7.080	40.300	5.940	4.550	3.410	1.440	1.310	.760
25	1.400	11.100	3.400	6.000	6.480	31.100	5.760	4.210	3.100	1.320	1.190	.730
26	1.400	10.300	3.200	6.000	5.820	26.200	7.020	4.250	3.100	1.150	1.150	.730
27	1.330	8.520	3.200	5.500	5.700	23.100	8.120	4.110	2.930	1.120	1.270	.730
28	1.300	6.840	3.200	5.000	4.750	22.000	7.440	3.820	2.590	1.080	1.390	.760
29	1.300	5.760	3.200	6.000		20.800	6.900	3.590	2.430	1.150	1.470	1.630
30	1.330	4.960	3.200	7.000		18.700	6.780	3.550	3.590	1.320	1.350	1.470
31	1.360		3.150	7.000		16.600		3.590		1.400	1.110	

POTOMAC RIVER AT WILLIAMSPORT, MARYLAND

This is the uppermost Water Pollution Surveillance System station on the Potomac River. It is located at the Hagerstown, Maryland municipal water treatment plant intake.

Preceding page blank

Station Location: Potomac River at Williamsport, Maryland

Major Basin: North Atlantic

Minor Basin: Potomac River

Station at: 39°35' Latitude 77°49' Longitude

Miles above mouth: 210

Activation Date: October 1957

Sampled by: Hagerstown Water Department

Field Analysis by: Hagerstown Water Department

Other Cooperating Agencies: Maryland State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Potomac at Point of Rocks, Maryland
Shenandoah at Millville, W. Va.

Gaging station operated by: Both stations U.S. Geological Survey

Drainage area at gaging station: See remarks

Period of record: Potomac River 1895 to present; Shenandoah River 1895-1909, 1928 to present

Average discharge in record period: See remarks

Maximum discharge in record period: –

Minimum discharge in record period: –

Remarks: Flow and drainage area at Williamsport computed as Potomac River at Point of Rocks, Maryland minus Shenandoah River at Millville, West Virginia. Estimated average discharge at Williamsport 6,650 cfs., for an estimated drainage area of 6,110 square miles. Flow affected by operation of upstream power plants.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.15	.10
	Na	12	7.2
	K	2.9	1.3
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	58	4
	Cd	*2	*2
	As	*19	*12
	B	19	15
	P	*5	*6
	Fe	101	6
	Mo	*2	*3
	Mn	*1	*1.2
	Al	–	31
	Be	*.05	*.03
	Cu	11	6
	Ag	*.4	*.3
	Ni	*2	*2
	Co	*4	*2
	Pb	5	*3
	Cr	*1	*3
	V	*2	*6
	Ba	49	27
	Sr	173	64

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.6	.5	April to June	1.4	.2
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION POTOMAC RIVER AT WILLIAMSPORT, MARYLAND

41

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												DATE OF DETERMINATION		RADIOACTIVITY IN PLANKTON			
					ALPHA						BETA								GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	12	14	-	-	-	-	-	-	3	6	12	8	15	10						
10	8	62	12	13	0	2	0	2	0	3	1	6	10	10	11	12						
10	15	62	12	24	-	-	-	-	-	-	7	4	19	6	26	7						
11	26	62	12	18	0	1	0	1	0	1	20	6	15	7	35	9						
12	3	62	1	23*	0	0	0	0	0	0	0	10	6	7	6	12						
1	28	63	2	21*	0	1	0	1	0	1	11	8	12	7	23	11						
2	25	63	3	11*	0	1	0	1	0	1	7	5	11	6	18	8						
3	25	63	4	15*	0	0	0	1	0	1	16	3	17	3	33	4						
4	29	63	5	22*	0	0	0	0	0	0	4	6	15	7	19	9						
5	27	63	6	19*	0	1	0	1	0	1	8	6	23	7	31	9						
6	24	63	7	24*	0	0	0	1	0	1	4	6	16	7	20	9						
7	29	63	8	19*	0	0	1	1	1	1	1	3	24	4	25	5						
8	26	63	9	25*	0	1	0	1	0	1	2	5	27	8	29	9						
9	30	63	10	23*	0	0	2	1	2	1	0	18	12	8	12	20						

736 - 493 O - 64 - 6

PLANKTON POPULATION

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WILLIAMSPORT, MARYLAND 041

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				ROTIFERS												CRUSTACEA									
														GENERA AND COUNT LEVEL (See text for Codes)										GENERA AND COUNT LEVEL (See text for Codes)								
														1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml.)	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
10	1	62	2	43	16	24	45	6	23	6	21		-	21	15	3									0							0	0
10	15	62	2	38	16	28	64	3	33	3	28		-	2											0							0	0
11	26	62	16	17	92	10	64	10	62	10	53		-	0											0							1	0
12	3	62											-	0											0							0	0
1	21	63	92	14	2	7	16	7	36	5	67		-	0											0							0	0
2	4	63	2	13	25	12	49	12	82	10	53		-	0											0							0	0
2	18	63	82	48	93	9	92	7	46	6	30	40	-	0											0							0	0
3	4	63	93	90	92	4	16	1	36	1	4		-	0											0							0	0
3	18	63	36	23	92	16	51	9	31	7	45		-	0											0							0	0
4	1	63	92	21	2	12	51	11	82	7	49		-	0											0							0	0
4	15	63	92	60	31	7	36	5	67	5	23		-	1											0							0	0
5	6	63	67	42	31	13	92	11	2	5	29		-	-											-							-	-
5	20	63	27	62	31	6	92	5	26	2	25		-	-											-							-	-
6	3	63	82	45	27	31	2	4	92	4	16		-	-											-							-	-
6	17	63	82	16	2	11	26	9	51	9	55		-	-											-							-	-
7	15	63											-	-											-							-	-
8	5	63											-	-											-							-	-
8	19	63	3	30	58	11	70	7	89	6	46		-	-											-							-	-
9	3	63	2	66	82	11	23	5	16	2	16		-	-											-							-	-
9	16	63	2	63	27	12	82	6	16	5	14		-	-											-							-	-

PLANKTON POPULATION

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION POTOMAC RIVER AT WILLIAMSPORT, MARYLAND

41

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	1700	0	20	40	0	0	0	590	1060	80	460	68	2	73	2	79	1														
10	15	62	8400	0	0	80	0	0	0	1040	7290	460	1780	73	5	79	4	87	3	68	2	71	2	88	1	81	1	85	1	92	1		
11	26	62	100	0	0	0	0	0	0	30	80	20	300																				
12	3	62	00	0	0	0	0	30	0	0	0	0	0																				
1	21	63	200	0	0	0	0	0	0	0	150	20	260																				
2	4	63	00	0	0	0	0	0	0	50	0	0	50																				
2	18	63	300	0	0	0	0	40	10	210	60	0	40	71	1																		
3	4	63	1400	0	0	0	0	0	0	0	1430	0	90	92	4																		
3	18	63	100	0	0	0	0	0	0	0	70	0	70																				
4	1	63	400	0	0	0	0	200	40	10	100	10	140	51	1																		
4	15	63	800	0	0	0	0	190	60	60	460	0	230	51	1	92	1																
5	6	63	600	0	0	0	0	0	0	0	590	0	310	88	2	92	1																
5	20	63	1000	0	20	200	0	180	0	530	110	0	240	68	2																		
6	3	63	5600	150	150	590	0	330	0	4140	240	290	400	71	5	68	4	30	1	26	1	17	1	3	1								
6	17	63	00	0	0	0	0	0	0	20	0	0	0																				
7	15	63	00	0	0	20	0	0	0	20	0	60	0																				
8	5	63	200	0	20	60	0	0	0	40	80	40	60																				
8	19	63	300	0	0	0	0	0	0	100	210	20	60																				
9	3	63	600	0	20	110	0	0	0	90	390	190	260	73	2																		
9	16	63	1100	20	20	180	0	20	0	250	610	70	140	73	2																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WILLIAMSPORT, MARYLAND

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	8	4132	229	105	124	2	22	35	1	1	32	1	13	8	2	23
11	5	62	11	13	4023	264	88	176	1	17	37	3	2	29	3	11	7	2	13
12	3	62	12	11	4288	169	52	117	1	12	21	2	2	16	1	7	3	1	7
1	7	63	2	14	4104	266	68	198	-	-	-	-	-	-	-	-	-	-	-
2	4	63	2	11	3877	264	88	176	4	17	39	7	5	25	2	11	5	2	10
3	4	63	3	12	2990	294	117	177	-	-	-	-	-	-	-	-	-	-	-
4	1	63	4	8	4079	182	90	92	3	31	21	2	3	14	2	8	8	1	18
5	6	63	5	13	4080	227	97	130	-	-	-	-	-	-	-	-	-	-	-
6	3	63	6	10	4435	215	113	102	8	28	29	1	1	25	2	11	15	1	21
7	1	63	7	8	4764	210	100	110	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	12	4535	196	103	93	5	25	28	1	1	25	1	12	13	3	17
9	2	63	9	9	3454*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	30	63	10	7	4715	205	75	130	2	17	26	0	1	23	2	10	6	2	12

* UNSATISFACTORY SAMPLE

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION POTOMAC RIVER AT WILLIAMSPORT, MARYLAND

41

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
10	3	62	16.0	8.8	7.8	1.0	-	-	-	-	-	96	160	5	2	-	-	280	-
10	15	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	600
1	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
1	9	63	1.1	-	7.3	-	-	-	-	-	-	64	106	5	10	-	-	-	-
1	11	63	1.1	-	7.3	-	-	-	-	-	-	38	56	5	45	-	-	-	-
1	21	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	390
1	23	63	1.1	-	7.3	-	-	-	-	-	-	38	76	5	10	-	-	-	-
1	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400
1	29	63	1.1	-	7.3	-	-	-	-	-	-	44	104	5	12	-	-	-	-
2	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
2	6	63	1.1	-	7.5	-	-	-	-	-	-	50	116	5	12	-	-	-	-
2	11	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37
2	12	63	1.1	-	7.5	-	-	-	-	-	-	46	108	5	8	-	-	-	-
2	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
2	25	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
2	26	63	1.1	-	7.4	-	-	-	-	-	-	56	112	5	12	-	-	-	-
3	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
3	6	63	1.1	-	6.9	-	-	-	-	-	-	14	64	-	1000	-	-	-	-
3	11	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	330
3	12	63	4.4	-	7.2	-	-	-	-	-	-	24	58	5	20	-	-	-	-
3	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4000
3	19	63	7.2	-	7.3	-	-	-	-	-	-	24	56	-	80	-	-	-	-
3	26	63	7.8	-	7.5	-	-	-	-	-	-	34	70	20	15	-	-	-	-
4	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1100
4	3	63	14.0	10.5	7.1	1.3	-	-	-	-	-	34	76	15	10	-	-	-	-
4	8	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
4	9	63	14.0	-	7.5	-	-	-	-	-	-	42	90	5	8	-	-	-	-
4	15	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
4	17	63	14.0	10.2	7.8	.8	-	-	-	-	-	48	98	5	5		.0	78	-
4	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110
4	23	63	16.7	-	8.3	-	-	-	-	-	-	52	104	5	2	-	-	-	-
5	1	63	15.0	10.0	7.6	1.0	-	-	-	-	-	44	98	10	8	-	-	118	-
5	5	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
5	7	63	17.2	-	7.5	-	-	-	-	-	-	48	92	5	6	-	-	-	-
5	15	63	18.0	9.0	7.9	.5	-	-	-	-	-	58	110	20	6		.0	106	-
5	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2700
5	21	63	19.4	-	7.5	-	-	-	-	-	-	56	100	10	8	-	-	-	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION POTOMAC RIVER AT WILLIAMSPORT, MARYLAND

DATE OF SAMPLE MONTH	DAY	YEAR	TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND 1-HOUR mg/l	CHLORINE DEMAND 24-HOUR mg/l	AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
5	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1100
5	28	63	17.8	-	7.5	-	-	-	-	-	-	54	104	5	6	-	-	-	-
6	3	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
6	5	63	20.0	-	7.5	-	-	-	-	-	-	54	104	5	14	-	-	-	-
6	10	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93
6	12	63	22.8	-	7.4	-	-	-	-	-	-	40	78	5	12	-	-	-	-
6	17	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	530
6	19	63	25.0	7.7	7.3	.3	-	-	-	-	-	48	80	15	10	-	-	-	-
6	25	63	23.3	-	7.9	-	-	-	-	-	-	54	102	5	6	-	-	-	-
7	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
7	2	63	27.8	-	7.7	-	-	-	-	-	-	64	102	10	5	-	-	-	-
7	8	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*3
7	9	63	25.0	-	7.9	-	-	-	-	-	-	66	148	5	4	-	-	-	-
7	15	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
7	17	63	25.0	7.2	7.5	.1	-	-	-	-	-	66	108	15	4	-	-	86	-
7	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
7	23	63	25.6	-	7.9	-	-	-	-	-	-	74	136	15	3	-	-	-	-
7	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
7	30	63	26.7	-	8.0	-	-	-	-	-	-	76	148	15	5	-	-	-	-
8	7	63	25.0	-	7.7	-	-	-	-	-	-	82	146	20	3	-	-	-	-
8	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	280
8	13	63	24.4	-	7.8	-	-	-	-	-	-	76	150	30	4	-	-	-	-
8	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
8	21	63	23.0	6.9	7.8	.8	-	-	-	-	-	82	154	20	5	-	-	280	-
8	26	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160
9	5	63	22.8	-	8.2	-	-	-	-	-	-	76	174	10	3	-	-	-	-
9	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
9	10	63	22.2	-	8.2	-	-	-	-	-	-	82	178	10	2	-	-	-	-
9	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
9	18	63	20.0	8.8	7.5	.7	-	-	-	-	-	76	152	15	2	-	-	268	-
9	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60
9	25	63	17.8	-	8.1	-	-	-	-	-	-	70	140	15	2	-	-	-	-
9	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Computed Data for Williamsport, Maryland
Operated by U.S. Geological Survey

STATE Maryland

MAJOR BASIN North Atlantic

MINOR BASIN Potomac River

STATION LOCATION Potomac River at Williamsport, Maryland

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.822	.896	2.910	1.750	4.100	2.370	9.550	4.270	2.260	1.750	1.140	.870
2	.988	.922	2.980	1.750	4.100	2.960	9.160	4.490	2.190	1.700	1.000	.830
3	1.040	1.300	2.630	1.700	4.100	3.230	8.730	4.680	2.250	1.740	.950	.760
4	.969	1.980	2.230	2.200	4.600	4.260	8.300	4.660	3.080	2.060	.936	1.030
5	.983	1.870	1.980	2.650	4.600	13.300	7.400	4.230	4.530	2.170	.890	1.010
6	1.020	1.620	2.230	2.650	3.720	65.200	6.840	3.950	12.700	2.050	.867	.959
7	1.310	1.490	2.410	2.150	3.340	86.100	6.410	3.720	11.200	2.520	.827	.885
8	1.410	1.330	3.600	2.150	3.260	60.000	6.000	3.530	9.440	2.080	.798	.839
9	1.440	1.270	3.410	2.100	3.020	34.300	5.780	3.350	8.570	1.760	.810	.972
10	1.480	1.260	3.040	2.000	2.920	24.200	5.630	3.170	6.930	1.530	.765	1.140
11	1.420	4.350	2.690	2.210	2.810	19.100	5.460	2.970	5.940	1.450	.820	1.250
12	1.310	10.400	2.060	3.340	2.750	17.700	5.270	2.770	5.830	1.360	.860	1.170
13	1.100	11.500	1.350	15.000	2.850	17.800	4.890	2.590	8.460	1.230	.914	1.040
14	1.060	7.740	1.390	28.300	2.530	47.400	4.520	2.470	8.740	1.210	.872	.915
15	1.010	5.280	1.560	25.400	2.520	54.600	4.240	2.520	6.670	1.220	.875	.839
16	.999	4.050	1.930	18.800	2.870	35.800	4.010	2.380	5.290	.976	.815	.940
17	.959	3.370	1.750	12.500	3.880	26.400	3.810	2.730	4.390	1.020	.745	.765
18	.879	2.920	1.870	9.650	3.370	27.300	3.820	3.750	3.670	1.040	.680	.715
19	.797	3.070	1.890	7.460	2.690	32.600	3.650	3.370	3.160	1.080	.745	.705
20	.769	4.740	1.730	6.530	2.670	30.900	3.650	3.500	2.730	1.080	1.130	.610
21	.711	7.960	1.820	6.150	2.720	86.100	3.750	4.020	2.410	1.100	.999	.660
22	.731	7.350	2.080	5.840	3.250	66.300	3.920	3.890	2.320	1.120	.987	.630
23	.797	6.830	1.970	5.230	4.070	33.600	3.680	3.400	2.130	1.060	.884	.549
24	.823	8.150	1.950	4.930	3.860	22.100	3.630	3.120	2.060	.962	.907	.625
25	.775	8.500	1.850	3.240	3.370	18.000	4.240	3.260	2.010	.911	.686	.590
26	.709	6.920	1.800	3.380	3.010	14.900	6.050	2.940	1.990	.935	.987	.575
27	.669	5.280	1.800	2.890	2.700	13.800	5.490	2.650	1.810	.901	.886	.620
28	.683	4.230	1.800	2.500	2.590	13.400	4.970	2.400	1.510	.869	.965	.540
29	.675	3.640	1.800	3.100		12.900	4.510	2.340	1.570	.859	1.010	.785
30	.631	3.150	1.800	3.600		11.600	4.360	2.280	1.670	.726	.854	.779
31	.856		1.800	3.600		10.300		2.310		1.040	.900	

Computed as Potomac River at Point of Rocks, Maryland less Shenandoah River at Millville, West Virginia.

SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA

The raw water source is the intake of the Schuylkill plant of the Philadelphia Water Department which is located two miles above Fairmont Dam. This point is near the northwest Philadelphia city limits and approximately 10 miles above where the Schuylkill River enters the Delaware.

There are a number of moderate sized cities above the station whose industrial and municipal effluents affect the characteristics of the water. Five major upstream communities are Reading, Pottstown, Norristown, Phoenixville and Conshohocken. The estimated population served by sewage treatment plants in these cities in 1962 was 243,000. The upper reaches of this river flow through anthracite coal mining areas.

The total count of algae in the September 3, 1963, sample was 29,000/ml of which 23,000 were Scenedesmus, indicating a high degree of enrichment.

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Station Location:	Schuylkill River at Philadelphia, Pennsylvania
Major Basin:	North Atlantic
Minor Basin:	Delaware-Schuylkill Rivers
Station at:	41°01' Latitude 75°12' Longitude
Miles above mouth:	10
Activation Date:	January 4, 1960
Sampled by:	Philadelphia Water Department
Field Analysis by:	Philadelphia Water Department
Other Cooperating Agencies:	Pennsylvania State Department of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Philadelphia, Pennsylvania
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	1,893 square miles
Period of record:	1931 to present
Average discharge in record period:	2,945 cfs. (adjusted for diversion)

Maximum discharge in record period: 96,200 cfs.

Minimum discharge in record period: See remarks

Remarks: Some regulation by upstream reservoir operations. Daily flow records do not include diversion for municipal supply. Gage located 40 feet upstream from Fairmont Dam. Minimum flow of 7 cfs. is leakage through locks.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.25	.25
	Na	13	13
	K	3.7	2.5
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	77	53
	Cd	*2	*4
	As	*20	30
	B	35	62
	P	*5	.04
	Fe	70	27
	Mo	*2	21
	Mn	*1	17
	Al	—	32
	Be	*.05	*.05
	Cu	7	11
	Ag	*.4	*.5
	Ni	*2	*8
	Co	*4	*2
	Pb	10	*5
	Cr	*1	*5
	V	*2	*10
	Ba	29	28
	Sr	110	81

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.3	.3	April to June	—	—
January to March	—	—	July to September	3.7	.6

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA 74

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO	DA	YR	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	1	62	11 15	-	-	-	-	- -	6	5	18	9	24	10					
10	15	62	12 3	-	-	-	-	- -	5	3	13	4	18	5					
11	19	62	12 21*	1	1	0	1	1 1	26	7	20	8	46	11					
12	17	62	1 23*	0	0	0	1	0 1	1	6	10	8	11	10					
1	21	63	3 1*	0	1	0	1	0 1	79	8	25	9	104	12					
2	18	63	3 27*	1	1	6	2	7 2	25	6	31	8	56	10					
3	18	63	4 16*	1	1	0	1	1 1	144	10	90	9	234	13					
4	15	63	6 3*	0	0	0	0	0 0	13	3	14	4	27	5					
5	20	63	6 24*	0	1	0	1	0 1	10	3	29	4	39	5					
6	17	63	7 30*	1	0	1	1	2 1	14	6	25	8	39	10					
7	15	63	9 9*	0	0	0	0	0 0	10	3	39	4	49	5					
8	19	63	10 10*	0	1	0	0	0 0	6	5	26	9	32	10					
9	16	63	10 31*	0	1	0	0	0 1	3	6	24	9	27	11					

PLANKTON POPULATION

STATE PENNSYLVANIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN DELAWARE-SCHUYLKILL RIVERS
STATION LOCATION SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA 074

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS										CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	26	56	70	19	65	5	58	3	17	-	-	50	15	3	20	2							0						1	0
10	15	62	26	42	70	21	58	7	2	5	25	110	0	6	20	1									3	50	1				0	0
11	5	62	62	20	26	13	16	7	36	6	54	-	-	3											1						1	0
11	19	62	26	16	62	16	64	11	92	10	47	-	-	2											0						0	0
12	3	62	62	27	92	9	26	8	71	5	51	60	0	3											0						1	1
12	17	62	80	20	70	10	82	9	64	7	54	-	-	0											0						0	0
1	7	63										-	-	0											0						0	0
1	21	63	36	34	88	8	62	7	86	6	45	-	-	1											0						0	0
2	4	63	70	13	71	7	2	7	65	6	67	-	-	0											0						0	0
2	18	63	70	14	9	9	65	9	93	8	60	-	-	2											0						0	0
3	4	63	92	12	36	9	46	6	71	6	67	-	-	0											0						0	0
3	18	63	62	17	86	11	36	10	65	7	55	-	-	1											0						0	0
4	1	63	62	16	86	9	36	9	65	8	58	-	-	0											0						0	0
4	15	63	92	47	62	8	65	7	26	6	32	-	-	2											0						0	0
5	6	63	92	29	67	21	70	15	89	0	29	-	-	-											-						-	-
5	20	63	92	22	70	20	26	12	82	6	40	-	-	-											-						-	-
6	3	63	26	38	70	11	92	11	27	5	35	-	-	-											-						-	-
6	17	63	70	28	92	11	82	10	26	9	42	-	-	-											-						-	-
8	19	63										-	-	-											-						-	-
9	3	63										-	-	-											-						-	-
9	16	63										-	-	-											-						-	-

PLANKTON POPULATION

STATE PENNSYLVANIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN DELAWARE-SCHUYLKILL RIVERS
STATION LOCATION SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA 74

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	1000	0	10	330	0	40	0	110	480	510	670	38	1	88	1																
10	15	62	1000	0	0	180	0	20	0	350	450	480	300	68	1	88	1																
11	5	62	5700	0	0	390	0	210	120	970	3970	80	1040	87	3	88	3	79	2	69	2	38	1	51	1	68	1	92	1				
11	19	62	900	40	0	40	0	40	0	20	750	0	80																				
12	3	62	1000	40	0	0	0	0	0	80	830	40	40	88	1	87	1	92	1														
12	17	62	100	0	20	0	0	0	0	30	60	30	20																				
1	7	63	00	0	0	0	0	0	0	0	0	30	30																				
1	21	63	1100	0	0	0	0	0	20	110	970	110	990	82	2	91	1																
2	4	63	200	0	20	20	0	0	0	20	130	40	210																				
2	18	63	100	0	0	20	0	20	0	30	80	0	90																				
3	4	63	300	0	0	0	0	20	0	0	320	60	820																				
3	18	63	500	0	0	0	0	40	0	90	330	0	370																				
4	1	63	500	0	0	20	0	0	40	110	290	110	420																				
4	15	63	400	0	0	20	0	70	0	0	310	20	220	92	1																		
5	6	63	1400	0	0	110	0	130	0	40	1080	20	70	88	2	92	2																
5	20	63	900	0	0	220	0	90	0	180	400	260	840																				
6	3	63	2500	0	0	950	0	730	0	570	290	130	680	38	3	51	2	68	2														
6	17	63	4500	20	250	2140	0	550	20	530	970	290	590	38	3	26	2	51	2	88	2	71	1	68	1	33	1	17	1	92	1		
8	19	63	23100	20	20	18670	0	290	0	3400	750	1200	210	38	7	44	4	25	4	29	1	31	1	45	1	51	1						
9	3	63	29600	90	0	27060	0	820	0	1400	190	520	90	38	8	25	5	51	3	31	2	37	2	44	1	59	1						
9	16	63	32900	10510	0	16990	0	2750	0	2070	590	860	740	4	7	38	6	34	5	51	5	25	4	24	3	37	2	44	2	35	1		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA 74

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
BEGINNING			END								NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	25	62	11	2	5310	298	140	158	3	22	46	4	3	38	1	27	7	4	31
11	23	62	12	3	4810	246	82	164	2	15	45	12	6	27	0	11	2	1	6
1	9	63	1	19	4850	192	47	145	1	5	29	8	4	16	1	6	1	1	4

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA 74

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	18.3	7.8	7.4	1.7	14	4.0	7.6	.2	15	64	186	30	10	125	.8	358	4900
10	8	62	19.4	7.0	7.4	1.8	14	4.3	6.9	.2	10	46	120	33	18	83	.6	218	6000
10	15	62	19.4	7.3	7.3	.9	16	3.9	6.5	.2	11	49	116	27	10	65	.6	205	6500
10	22	62	17.8	6.1	7.3	.7	15	3.6	6.1	.2	9	63	124	25	8	71	.8	218	4400
10	29	62	13.3	7.0	7.3	1.7	11	3.7	-	.2	20	67	140	7	8	80	.9	237	4200
11	5	62	11.7	10.6	7.4	3.5	21	-	-	.6	18	51	100	75	55	58	.5	197	34000
11	12	62	10.6	13.0	7.2	1.0	12	3.3	6.3	.2	19	34	76	56	23	47	.4	124	-
11	13	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6000
11	19	62	9.4	11.1	7.2	.7	8	-	-	.2	18	43	96	22	8	55	.5	177	14000
11	26	62	8.3	11.3	7.3	.8	7	3.9	6.2	.3	22	45	108	23	7	49	.6	170	2700
12	3	62	8.3	10.6	7.2	2.0	9	2.8	4.9	.4	13	33	112	8	8	64	.7	187	3500
12	10	62	5.6	12.2	7.3	1.0	12	1.4	4.9	.2	8	40	112	22	12	80	.9	177	21000
12	17	62	8.3	12.7	7.3	.7	10	4.9	6.0	.4	17	54	140	8	7	84	.4	201	1500
12	24	62	3.3	12.9	7.3	1.1	9	-	-	.5	20	57	144	12	7	98	.5	252	-
12	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	930
1	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7800
1	7	63	3.3	11.7	7.4	-	10	3.2	3.8	.6	18	71	250	10	8	117	.7	311	600
1	14	63	3.9	13.1	7.3	5.2	24	3.2	9.9	.6	15	45	104	100	100	52	.5	160	-
1	21	63	3.9	12.7	7.5	3.7	25	1.9	10.9	.5	19	51	9?	32	35	54	.5	197	11000
1	28	63	1.1	13.6	7.5	1.9	11	5.3	6.7	.4	16	54	100	23	10	58	.5	197	4700
2	4	63	2.8	13.2	7.4	1.9	12	4.0	7.9	.5	22	59	132	23	10	79	.4	220	3100
2	11	63	2.8	12.4	7.4	-	13	-	-	.5	28	50	144	23	8	90	.7	243	1400
2	18	63	2.2	12.8	7.3	3.1	16	2.2	3.2	.6	22	54	140	28	18	-	.6	250	1100
2	25	63	2.8	12.2	7.2	3.9	19	2.4	5.4	.9	28	52	152	28	18	103	.8	231	4500
3	4	63	3.4	12.6	7.3	8.1	10	3.7	7.7	.7	22	41	106	140	130	68	.2	211	16000
3	11	63	5.0	12.5	7.3	1.2	23	5.3	9.2	.6	8	37	52	110	100	35	.3	131	5000
3	18	63	7.2	11.7	7.4	1.4	17	4.8	8.1	.4	11	36	72	80	80	44	.2	139	6600
3	25	63	7.2	11.8	7.4	1.1	9	2.2	4.4	.2	9	36	90	8	12	49	.4	149	*33
4	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8600
4	8	63	12.2	9.0	7.4	.6	12	-	-	.2	13	53	108	18	8	64	.6	184	10000
4	15	63	13.3	8.3	7.5	2.0	12	-	-	.2	14	55	124	18	8	75	.6	201	900
4	22	63	18.3	7.7	7.7	2.1	15	3.2	6.7	.2	20	61	142	23	8	72	.6	240	5500
4	29	63	16.7	8.4	7.6	3.9	17	2.5	4.0	.2	19	69	152	32	8	81	.6	282	1300
5	6	63	18.3	6.2	7.3	1.7	11	.8	6.4	.2	16	50	144	20	8	77	.6	261	530
5	13	63	20.6	6.7	7.5	2.9	15	3.5	6.4	.2	19	63	168	23	8	116	.5	298	-
5	20	63	21.7	6.4	7.5	2.3	12	3.8	6.4	.2	21	64	180	23	8	140	.5	302	-
5	27	63	19.4	6.1	7.3	1.7	11	-	-	.3	16	49	138	18	8	82	.4	256	2700
6	3	63	22.2	5.9	7.3	1.6	11	4.5	6.6	.3	17	53	1?6	22	8	93	.5	296	5200
6	10	63	25.6	4.8	7.3	1.4	12	3.3	6.3	.2	19	59	186	23	8	121	.6	290	6000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN DELAWARE-SCHUYLKILL RIVERS

STATION LOCATION SCHUYLKILL RIVER AT PHILADELPHIA, PENNSYLVANIA 74

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (cobalt units)	TURBIDITY (silica units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	17	63	22.8	6.2	7.3	2.0	13	–	–	.2	19	61	144	15	15	74	–	247	14000
6	24	63	24.4	7.3	7.6	2.9	20	3.2	7.7	.4	19	65	152	20	12	82	.5	271	2500
7	1	63	29.0	2.7	7.3	–	18	–	–	.4	17	71	172	16	10	95	.9	287	6700
7	8	63	26.0	6.7	7.5	2.4	15	3.2	7.3	.2	25	75	168	30	8	82	.8	242	2000
7	15	63	25.0	4.4	7.3	1.9	18	2.9	7.3	.2	22	76	162	18	12	102	.7	302	8000
7	22	63	29.0	3.8	7.3	2.4	20	4.5	10.4	.2	26	87	160	35	25	97	.7	280	2600
7	29	63	29.0	5.3	7.6	2.5	19	4.9	8.8	.4	29	89	176	32	20	100	–	340	4000
8	5	63	27.0	5.6	7.4	1.6	17	3.4	8.8	.3	23	73	148	25	18	74	.6	279	4500
8	12	63	26.7	8.4	7.5	3.3	23	3.8	9.6	.4	22	70	188	50	13	91	.5	278	46000
8	19	63	25.0	11.7	8.3	4.8	28	4.2	7.4	.2	34	86	192	56	15	110	.7	386	–
8	20	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	26	63	25.0	7.2	7.3	3.4	27	–	–	.2	36	85	184	36	22	94	.5	330	1800
9	3	63	24.4	7.6	7.3	4.6	24	4.6	8.8	.2	37	91	192	45	18	100	.6	360	1100
9	9	63	23.3	7.4	7.2	3.3	19	3.8	6.8	.2	18	62	134	32	10	62	.4	233	14000
9	16	63	20.0	5.6	7.3	2.7	31	4.0	6.9	.4	26	81	182	36	23	70	.8	284	5300
9	23	63	19.4	3.9	7.2	1.7	17	4.8	6.8	.5	35	75	280	45	12	140	.6	400	6300
9	30	63	17.2	4.3	7.1	1.8	17	4.4	7.4	.4	29	71	212	28	18	–	.7	376	14000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Philadelphia, Pennsylvania
Operated by U.S. Geological Survey

STATE Pennsylvania

MAJOR BASIN North Atlantic

MINOR BASIN Delaware-Schuylkill Rivers

STATION LOCATION Schuylkill River at Philadelphia, Pennsylvania

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1.600	2.130	2.230	2.100	1.640	1.000	3.440	1.540	.930	.670	.450	.111
2	1.190	1.600	2.180	1.000	1.600	2.290	3.230	2.280	.786	.446	1.500	.101
3	.966	1.850	2.090	1.150	2.680	3.580	3.080	1.600	.858	.350	1.410	.418
4	.858	4.690	1.950	1.190	2.700	3.880	2.820	1.310	1.000	.216	.800	3.240
5	1.040	3.600	1.900	1.070	2.300	10.100	2.520	1.190	.966	.198	.540	1.620
6	3.600	2.920	2.470	1.000	2.330	16.600	2.280	1.110	.966	.135	.370	.523
7	2.920	2.370	7.020	.894	2.920	16.800	2.140	1.040	1.200	.149	.235	.280
8	2.180	2.000	5.290	.894	2.330	11.000	2.090	.966	1.000	.255	.230	.217
9	2.180	1.730	4.090	.858	1.600	8.510	1.950	.930	1.000	.382	.230	.198
10	2.280	8.040	3.550	.858	1.470	6.560	1.910	.894	.855	.255	.220	.163
11	2.620	9.210	2.970	.930	1.830	6.820	1.770	1.150	1.200	.235	.180	.135
12	2.230	6.360	2.470	2.400	6.600	6.950	1.640	1.350	1.120	.181	.160	.135
13	1.860	4.650	2.040	5.640	4.040	7.340	1.550	1.110	.818	.216	.180	.123
14	1.550	3.710	1.910	5.170	2.280	6.000	1.470	.930	.670	.275	.240	.123
15	1.350	3.020	1.850	3.440	1.690	5.700	1.390	.894	.818	.300	.450	.148
16	1.190	2.620	1.800	2.670	1.230	5.460	1.270	.858	1.160	.325	.200	.375
17	1.070	2.570	1.700	2.230	1.190	6.880	1.230	.786	.892	.300	.140	.327
18	1.000	2.720	1.650	2.000	1.270	7.540	1.270	1.080	.670	.220	.100	.303
19	.894	3.660	1.600	1.950	1.820	6.760	1.270	2.040	.606	.200	.100	.258
20	.786	3.230	1.500	4.010	2.740	8.380	1.230	2.230	.542	.210	.250	.198
21	.786	3.020	1.400	6.060	3.810	7.810	1.110	1.820	.574	.210	.270	.180
22	.683	6.570	1.350	3.600	2.000	6.180	1.040	1.640	.606	.300	.270	.148
23	.716	4.880	1.500	2.820	1.350	5.230	1.040	1.510	.510	.450	.260	.123
24	.620	3.600	1.400	2.570	1.270	4.600	1.000	1.270	.414	.350	.270	.112
25	.590	3.180	1.300	1.800	1.190	4.200	1.040	1.110	.382	.290	.170	.093
26	.620	3.130	1.250	1.450	1.150	4.090	.930	1.040	.325	.240	.110	.085
27	.533	3.080	1.200	2.140	1.040	5.530	.894	1.040	.300	.198	.095	.085
28	.590	2.820	1.150	1.700	.966	5.760	.822	1.110	.300	.164	.070	.085
29	.533	2.620	1.110	1.200		4.650	.786	1.070	.391	.350	.077	.935
30	.533	2.420	1.070	1.270		4.090	.930	1.070	.733	.414	.101	1.610
31	.774		.768	1.430		3.760		1.110		.216	.122	

SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA

This sampling point is at the intake of the U.S. Army Corps of Engineers pumping station.

Carbon adsorption method samples collected from Berryville from January through July showed the presence of nitriles and amines at this station, indicating industrial pollution. Nitrile compounds, forms of organic cyanide, are employed in many industrial processes. The amines have been shown by thin-layer chromatography to be tertiary and/or quaternary. The exact fate of nitriles and amines in watercourses and impact on aquatic life are not completely understood, although recovery of these materials as far downstream as the Potomac River at Great Falls, Maryland indicates that they are relatively stable materials. These two stations are the only ones within the PHS Water Pollution Surveillance System at which nitriles and amines have been identified.

Recent investigation has shown that samples from this station were contaminated with copper from the intake line. Values for copper concentrations and for coliform bacteria populations have accordingly been deleted from this compilation. Values published in previous compilations for samples taken after November 1, 1961 are also erroneous.

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Station Location: Shenandoah River at Berryville, Virginia

Major Basin: North Atlantic

Minor Basin: Potomac River

Station at: 39°07' Latitude 77°53' Longitude

Miles above mouth: 25 (approximate)

Activation Date: June 1, 1961

Sampled by: U.S. Army Corps of Engineers

Field Analysis by: U.S. Army Corps of Engineers

Other Cooperating Agencies: Virginia State Water Control Board

Hydrologic Data:

Nearest pertinent gaging station: At Millville, West Virginia

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 3,040 square miles

Period of record: 1895-1908, 1928 to present

Average discharge in record period: 2,694 cfs. (47 year average)

Maximum discharge in record period: 230,000 cfs.

Minimum discharge in record period: 59 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.21	.05
	Na	21	14
	K	2.9	1.9
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	186	61
	Cd	*3	*2
	As	31	*20
	B	26	180
	P	8	*18
	Fe	70	*4
	Mo	*3	14
	Mn	*1.6	3
	Al	—	35
	Be	*.08	*.05
	Cu	—	—
	Ag	*.6	*.5
	Ni	*3	*2
	Co	*6	*2
	Pb	*8	5
	Cr	*2	*5
	V	*3	*10
	Ba	7	31
	Sr	85	66

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.8	.2	April to June	1.2	.2
January to March	—	—	July to September	—	—

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
10/24 - 10/31/62	Nitrile & Amine	
11/28 - 12/5/62	Nitrile & Amine	
12/26 - 1/2/63	Nitrile & Amine	
1/23 - 1/30/63	Nitrile & Amine	
6/26 - 7/3/63	Nitrile & Amine	
7/31 - 8/7/63	Nitrile & Amine	
8/28 - 9/4/63	Nitrile & Amine	

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE VIRGINIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA 87

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	17	62	11	16	0	0	1	2	1	2	7	7	18	10	25	12						
10	24	62	11	21	0	1	0	0	0	1	23	6	30	9	53	11						
10	31	62	11	26	0	0	0	0	0	0	10	3	30	5	40	6						
11	7	62	11	30	0	0	2	2	2	2	16	6	23	8	39	10						
11	14	62	12	28	1	1	0	1	1	1	10	5	21	7	31	9						
11	21	62	12	31	0	1	1	1	1	1	20	4	35	5	55	6						
11	28	62	12	18	0	0	0	0	0	0	10	6	39	9	49	11						
12	5	62	12	31	0	0	0	1	0	1	6	3	13	5	19	6						
12	19	62	1	11	0	1	1	2	1	2	3	5	12	7	15	9						
12	26	62	1	15	0	0	1	1	1	1	17	7	18	9	35	11						
1	30	63	2	19*	0	0	1	1	1	1	20	7	16	8	36	10						
2	28	63	3	22*	0	1	0	1	0	1	6	6	15	8	21	10						
3	27	63	4	17*	0	1	7	4	7	4	23	7	103	13	126	26						
4	24	63	5	31*	0	1	0	1	0	1	12	4	19	5	31	6						
5	29	63	6	24*	0	1	0	1	0	1	19	3	14	4	33	5						
6	26	63	7	30*	0	1	0	1	0	1	20	7	16	8	36	11						
7	31	63	8	21*	1	1	0	1	1	1	43	8	19	9	62	12						
8	28	63	10	4*	1	1	1	1	2	1	24	6	31	9	55	11						
9	16	63	11	6*	0	1	0	2	0	2	15	7	14	9	29	11						

PLANKTON POPULATION

STATE VIRGINIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA 087

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS										CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See text for Codes)											GENERA AND COUNT LEVEL (See text for Codes)								
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD			
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	3	62	64	32	26	12	16	9	88	8	39	20	-	2										3	76	1					0	0
10	17	62	70	26	26	21	65	17	62	7	29	-	-	37	2	3								0							0	1
11	7	62	62	12	64	9	92	8	70	7	64	-	-	5										1							0	0
11	19	62	88	20	64	14	16	10	36	8	48	-	-	0										0							0	0
12	5	62	88	14	92	11	36	10	62	10	55	30	-	3										0							0	0
12	19	62	88	32	3	14	64	8	86	7	39	-	-	0										0							0	0
1	9	63	86	36	88	36	64	4	93	4	20	-	-	0										0							0	0
1	23	63	36	25	64	12	71	6	72	6	51	-	-	0										0							0	0
2	6	63	36	12	65	7	64	6	51	6	69	-	-	1										1							0	0
2	20	63	86	25	31	12	92	10	36	9	44	-	-	0										0							0	0
3	6	63	36	73	92	14	71	3	15	2	8	-	-	0										0							0	0
3	20	63										-	-	-										-							-	-
4	3	63	65	21	36	18	92	12	16	9	40	-	-	2										0							0	0
4	17	63	82	43	67	13	26	8	92	5	31	-	-	1										0							1	0
5	8	63	71	16	62	12	92	12	65	6	54	-	-	-										-							-	-
5	22	63	70	12	31	12	64	10	82	6	60	-	-	-										-							-	-
6	5	63	92	16	36	14	62	7	31	5	58	-	-	-										-							-	-
6	19	63	26	37	82	11	31	10	64	6	36	-	-	-										-							-	-
8	7	63										-	-	-										-							-	-
8	14	63										-	-	-										-							-	-
9	4	63										-	-	-										-							-	-
9	18	63										-	-	-										-							-	-

PLANKTON POPULATION

STATE VIRGINIA
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN POTOMAC RIVER
STATION LOCATION SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA

87

DATE OF SAMPLE			ALGAE (Number per milliliter)										INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
				BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR	TOTAL	COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PERRATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	3	62	4400	90	140	1350	0	0	0	430	2410	830	4230	87	3	38	3	68	2	79	2	91	1	86	1								
10	17	62	3100	0	90	990	0	20	0	290	1690	180	610	38	3	88	3	87	3	68	1												
11	7	62	300	0	30	0	0	0	0	30	260	80	140																				
11	19	62	900	0	50	40	20	70	0	180	540	90	20																				
12	5	62	500	0	20	0	0	20	0	60	380	30	500																				
12	19	62	100	0	0	0	0	0	0	0	120	20	80																				
1	9	63	1000	0	0	0	0	20	0	0	1010	0	150	91	3																		
1	23	63	500	0	0	20	0	0	0	0	480	0	180	82	2																		
2	6	63	300	0	0	0	0	0	0	40	270	20	190																				
2	20	63	200	0	0	0	0	10	30	10	140	0	60																				
3	6	63	13200	0	20	130	0	420	0	130	12520	130	8820	82	6	92	4	79	2	88	2	87	2	85	1	51	1	52	1				
3	20	63	9400	0	80	80	0	170	20	550	8530	170	9950																				
4	3	63	600	0	40	70	0	90	0	0	440	40	1300	87	1																		
4	17	63	2100	0	0	0	0	200	0	1120	750	20	590	71	3	88	1	51	1	87	1	68	1										
5	8	63	7600	340	250	880	0	210	0	420	5540	1640	10920	88	4	92	4	87	3	91	2	38	2	81	2	3	2	82	1	17	1	25	1
5	22	63	29200	0	820	24110	0	420	50	400	3400	340	2100	44	7	38	5	26	5	33	4	87	3	17	3	88	3	51	2	81	2	91	2
6	5	63	3800	40	40	1090	0	800	0	620	1220	710	8110	38	3	68	3	51	2	52	1	92	1	82	1	87	1	81	1				
6	19	63	22700	760	250	17390	0	110	20	2230	1990	740	940	38	6	40	4	44	4	26	4	25	4	68	4	3	3	81	2	71	2	87	2
8	7	63	72900	2260	0	59790	0	270	0	8490	2070	16020	3810																				
8	14	63	50100	490	0	43460	0	150	0	2930	2930	5830	1750																				
9	4	63	49300	220	0	31260	0	170	40	15220	2280	6880	2410	38	8	25	5	24	5	44	4	29	2	45	1	3	1	37	1	31	1	35	1
9	18	63	61000	0	0	50090	0	90	0	9630	1220	3150	990	31	8	38	7	24	5	25	5	44	2	30	2	41	1	45	1	29	1		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE VIRGINIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA 87

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES										
BEGINNING			END								NEUTRALS								
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	24	62	10	31	4447	303	201	102	8	137	20	1	1	18	0	4	2	8	22
11	28	62	12	5	4573	274	222	52	9	153	20	1	1	17	1	4	4	2	30
12	26	62	1	2	3753	477	316	161	13	237	25	2	2	21	0	3	3	13	22
1	23	63	1	30	4587	191	110	81	3	65	17	2	1	14	0	3	1	2	19
2	28	63	3	6	3815	360	284	76	20	145	54	16	10	28	0	11	9	9	36
3	27	63	4	3	4356	107	34	73	2	12	13	3	2	8	0	2	1	1	3
4	24	63	4	30	3964	176	116	60	8	71	20	2	2	14	2	4	2	2	9
4	30	63	5	10	4959	191	120	71	4	67	28	2	3	20	3	4	1	2	14
5	29	63	6	5	3719	268	187	81	9	86	28	2	2	23	1	7	3	4	50
6	26	63	7	3	3789	246	151	95	7	58	32	3	5	24	0	11	5	6	32
7	31	63	8	7	2351	462	308	154	8	150	70	3	3	62	2	20	6	10	44
8	28	63	9	4	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* FLOW UNKNOWN

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE VIRGINIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA 87

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	3	62	18.3	8.3	8.6	1.8	-	1.7	5.2	-	-	-	-	-	-	-	-	-	-
10	10	62	18.3	8.0	8.4	2.0	-	1.7	5.9	-	-	-	-	-	-	-	-	-	-
10	17	62	20.5	7.3	7.9	1.9	-	1.7	4.8	-	19	152	192	5	*25	76	.0	289	-
10	24	62	13.3	8.6	7.8	-	-	1.5	3.9	-	21	156	192	5	*25	94	.0	320	-
10	31	62	-	-	7.8	-	-	-	-	-	23	148	192	5	*25	86	.0	312	-
11	7	62	5.0	-	8.0	-	-	-	-	-	18	150	184	5	*25	75	.0	308	-
11	14	62	7.5	-	8.3	-	-	.2	7.6	-	11	76	140	10	*25	33	.0	162	-
11	21	62	7.0	10.8	8.0	1.9	-	-	-	-	7	88	116	0	*25	41	.0	170	-
11	28	62	7.5	-	8.1	-	-	.8	5.3	-	10	110	148	5	*25	31	.0	195	-
12	5	62	-	-	7.8	-	-	.9	3.0	-	10	114	148	5	*25	53	.0	217	-
12	12	62	.0	14.7	9.7	2.9	-	1.0	2.8	-	-	-	-	-	-	-	-	-	-
12	19	62	.2	13.1	8.2	-	-	.9	2.4	-	12	128	168	0	*25	68	.0	235	-
12	26	62	.1	14.6	7.9	2.9	-	.9	3.4	-	11	132	92	-	*25	49	.0	215	-
1	2	63	.1	-	7.9	-	-	-	-	-	9	134	180	-	*25	76	.0	276	-
1	9	63	.0	13.2	7.9	2.9	-	.8	3.3	-	11	118	180	-	*25	56	.0	235	-
1	16	63	2.1	-	7.6	-	-	-	-	-	5	52	76	-	*25	22	.8	103	-
1	23	63	2.0	13.3	7.6	2.9	-	-	-	-	7	92	128	-	*25	31	.0	150	-
1	30	63	.0	-	8.0	-	-	.9	3.7	-	10	120	150	-	*25	46	.0	205	-
2	6	63	.1	-	7.8	-	-	-	-	-	10	116	152	5	*25	48	.0	210	-
2	13	63	1.5	-	8.3	-	-	1.8	2.8	-	-	-	-	-	-	-	-	-	-
2	20	63	2.1	-	7.8	-	-	-	-	-	12	192	172	0	*25	20	.0	225	-
2	28	63	1.5	-	8.2	-	-	-	-	-	10	116	136	5	*25	49	.0	190	-
3	6	63	2.5	-	8.0	-	-	-	-	-	9	84	110	20	200	24	.3	163	-
3	13	63	5.0	-	8.1	-	-	-	-	-	4	64	80	5	*25	18	.0	98	-
3	20	63	7.7	-	8.8	-	-	-	-	-	5	84	104	20	550	20	.0	140	-
3	27	63	11.1	-	8.2	-	-	-	-	-	7	88	104	0	*25	20	.0	130	-
4	3	63	15.5	9.2	8.3	1.2	-	1.8	5.3	-	6	104	124	5	*25	26	.0	160	-
4	10	63	12.2	10.2	8.8	2.8	-	1.6	4.5	-	12	116	136	5	*25	33	.0	188	-
4	17	63	13.3	-	7.3	-	-	1.4	4.1	-	9	120	160	0	*25	36	.0	200	-
4	24	63	15.0	8.6	7.4	2.0	-	1.4	4.1	-	14	132	156	10	*25	40	.0	196	-
5	1	63	12.2	-	8.5	-	-	-	3.9	-	13	132	156	5	*25	40	.0	210	-
5	8	63	17.2	-	8.4	-	-	2.8	8.3	-	19	140	176	5	53	42	.0	220	-
5	15	63	10.9	-	8.6	-	-	-	-	-	13	128	148	5	*25	52	.0	220	-
5	22	63	-	-	-	-	-	-	-	-	12	132	152	5	*25	52	.0	149	-
5	29	63	19.0	8.5	8.7	-	-	-	-	-	10	124	156	5	*25	55	.0	240	-
6	5	63	19.5	-	8.0	-	-	4.1	12.3	-	9	112	136	5	*25	35	.0	190	-
6	12	63	23.5	-	8.4	-	-	2.1	5.9	-	6	108	136	10	*25	42	.0	187	-
6	19	63	23.6	-	8.6	-	-	2.8	6.7	-	14	116	152	5	*25	55	.0	220	-
6	26	63	24.8	7.2	8.6	3.8	-	2.4	7.8	-	13	114	140	10	*25	69	.0	250	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE VIRGINIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN POTOMAC RIVER

STATION LOCATION SHENANDOAH RIVER AT BERRYVILLE, VIRGINIA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	3	63	27.2	-	8.6	-	-	-	-	-	18	158	210	5	140	95	.2	330	-
7	10	63	-	-	-	-	-	4.4	10.4	-	14	116	156	10	*25	75	.0	260	-
7	17	63	24.6	-	8.8	-	-	4.1	12.7	-	16	90	132	0	*25	100	.1	250	-
7	24	63	24.7	-	8.4	-	-	2.3	10.0	-	16	120	160	5	*25	90	.0	290	-
7	31	63	24.5	-	8.3	-	-	2.7	10.3	-	22	110	164	5	*25	90	.0	280	-
8	7	63	25.0	5.1	8.1	4.8	-	2.5	8.0	-	24	114	160	5	*25	96	.0	280	-
8	14	63	20.0	-	8.2	-	-	2.0	10.0	-	20	140	190	5	*25	120	.0	320	-
8	21	63	23.0	5.3	8.1	-	-	2.8	9.8	-	20	120	160	0	*25	122	.0	320	-
8	28	63	23.5	-	8.3	-	-	-	-	-	22	112	152	5	*25	90	.0	400	-
9	4	63	23.0	-	8.2	-	-	3.0	10.1	-	23	130	190	0	*25	125	.0	380	-
9	11	63	-	-	-	-	-	-	-	-	20	130	180	0	*25	110	.0	290	-
9	18	63	19.0	-	8.5	-	-	-	-	-	-	112	160	15	*25	125	.0	320	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Millville, West Virginia
Operated by U.S. Geological Survey

STATE Virginia

MAJOR BASIN North Atlantic

MINOR BASIN Potomac River

STATION LOCATION Shenandoah River at Berryville, Virginia

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.548	.554	1.170	.750	1.400	1.580	3.450	1.480	.900	.794	.428	.390
2	.522	.608	1.040	.750	1.400	1.510	3.240	1.510	.936	.738	.438	.390
3	.528	.560	1.030	.800	1.400	2.420	3.070	1.610	1.480	.754	.450	.380
4	.541	.601	.972	.800	1.400	4.860	2.900	1.520	2.710	.754	.444	.390
5	.587	.608	.936	.850	1.400	5.170	2.700	1.450	3.240	.754	.450	.406
6	.658	.622	1.030	.850	1.400	6.730	2.520	1.410	3.160	.794	.433	.468
7	.650	.587	1.310	.850	1.400	9.970	2.390	1.380	2.350	.810	.433	.515
8	.650	.587	1.450	.850	1.400	9.710	2.320	1.360	1.960	.730	.422	.541
9	.682	.601	1.360	.900	1.400	7.330	2.270	1.290	1.730	.682	.390	.528
10	.643	1.520	1.310	1.000	1.370	5.630	2.160	1.230	1.550	.601	.395	.515
11	.594	3.290	1.160	1.290	1.240	4.670	2.100	1.260	1.540	.567	.400	.444
12	.497	3.920	.972	2.660	1.330	4.670	2.020	1.150	1.310	.548	.400	.438
13	.522	2.810	.770	7.020	1.330	15.200	1.950	1.070	1.240	.567	.406	.422
14	.509	1.870	.900	11.700	1.320	28.700	1.880	1.130	1.070	.554	.428	.385
15	.503	1.500	.882	8.220	1.400	18.700	1.840	1.080	1.080	.522	.365	.461
16	.491	1.350	.936	5.690	1.250	11.200	1.740	1.070	.972	.554	.365	.340
17	.491	1.150	.990	4.270	1.120	8.740	1.730	1.090	.891	.594	.375	.355
18	.491	1.000	.954	3.450	1.130	8.980	1.640	1.170	.909	.587	.380	.385
19	.473	1.250	.900	2.940	1.260	8.840	1.630	1.130	.855	.548	.355	.355
20	.461	1.550	.927	2.630	1.310	22.500	1.600	1.140	.778	.554	.422	.390
21	.479	1.450	.945	2.450	1.670	29.900	1.570	1.260	1.070	.534	.461	.400
22	.479	2.050	.810	2.320	2.080	15.700	1.510	1.140	.981	.515	.433	.370
23	.473	2.250	.786	2.410	2.230	10.400	1.500	1.040	.837	.485	.416	.411
24	.467	2.150	.750	2.080	1.820	7.930	1.440	.936	.754	.438	.433	.355
25	.455	2.000	.750	1.700	1.680	6.580	1.510	.972	.882	.509	.594	.330
26	.461	1.800	.700	1.600	1.510	5.710	1.510	.945	.769	.485	.643	.365
27	.461	1.700	.700	1.500	1.550	5.130	1.500	.918	.582	.479	.534	.340
28	.467	1.450	.700	1.450	1.490	4.860	1.390	.900	.706	.491	.455	.340
29	.455	1.300	.700	1.400		4.570	1.390	.900	.650	.461	.330	.455
30	.479	1.200	.700	1.400		4.040	1.390	.936	.674	.534	.406	.461
31	.534		.700	1.400		3.690		.927		.491	.400	

SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND

This sampling point is located at the Conowingo hydroelectric power plant a few miles downstream from the Pennsylvania-Maryland State line and 10 miles above the mouth of the river on Chesapeake Bay.

The watershed upstream from the station in Pennsylvania includes a highly populated and industrialized area. There are, however, no known significant pollution sources in the immediate vicinity of the station. To supplement its present supply the city of Baltimore, Maryland, has undertaken the construction of an intake structure about one-quarter mile upstream from the station.

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Station Location:	Susquehanna River at Conowingo, Maryland
Major Basin:	North Atlantic
Minor Basin:	Susquehanna-Juniata Rivers
Station at:	39°39' Latitude 76°11' Longitude
Miles above mouth:	10
Activation Date:	June 27, 1960
Sampled by:	Baltimore Bureau of Water Supply
Field Analysis by:	Baltimore Bureau of Water Supply
Other Cooperating Agencies:	Maryland State Department of Health Philadelphia Electric Company
Hydrologic Data:	
Nearest pertinent gaging station:	At Marietta, Pennsylvania
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	25,990 square miles
Period of record:	1931 to present
Average discharge in record period:	36,270 cfs.

Maximum discharge in record period: 787,000 cfs.

Minimum discharge in record period: 618 cfs.

Remarks: Regulation for hydroelectric power production at flows less than 8,000 cfs.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.12	.10
	Na	7.0	4.5
	K	2.3	1.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	13	12
	Cd	*2	*2
	As	*18	*13
	B	29	24
	P	*9	*6
	Fe	52	4
	Mo	18	6
	Mn	*.5	2.5
	Al	—	*3
	Be	*.04	*.03
	Cu	2	6
	Ag	*.4	*.3
	Ni	*1	*2
	Co	*4	*2
	Pb	*9	3
	Cr	*1	*3
	V	*2	6
	Ba	21	21
	Sr	65	47

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.2	.2	April to June	1.6	.2
January to March	—	—	July to September	—	—

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
10/2 - 10/11/62	DDT	
11/2 - 11/14/62	DDT	
1/21 - 1/30/63	DDT	
7/24 - 8/2/63	Dieldrin	0.004

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA-JUNIATA

STATION LOCATION SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND 75

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	3	62	11	2	-	-	-	-	-	-	0	5	16	9	16	10						
10	10	62	11	16	-	-	-	-	-	-	4	10	12	7	16	12						
10	17	62	11	9	-	-	-	-	-	-	3	5	435	15	438	16						
10	24	62	11	17	-	-	-	-	-	-	3	6	6	8	9	10						
10	31	62	11	26	-	-	-	-	-	-	16	5	24	6	40	8						
11	28	62	12	26*	0	0	0	0	0	0	10	5	15	6	25	8						
12	19	62	1	24*	0	0	0	1	0	1	7	7	9	7	16	10						
1	30	63	2	21*	0	0	0	1	0	1	8	7	16	8	24	11						
-	27	63	3	18*	0	1	1	1	1	1	6	3	14	4	20	5						
3	27	63	4	16*	0	0	0	1	0	1	23	7	15	7	38	10						
4	24	63	5	24*	0	0	0	1	0	1	9	6	10	6	19	8						
5	29	63	6	24*	0	0	0	0	0	0	5	3	14	3	19	4						
6	26	63	7	31*	0	0	0	1	0	1	7	6	22	7	29	9						
7	24	63	9	9*	0	0	0	0	0	0	2	3	16	4	18	5						
8	28	63	10	1*	1	0	0	1	1	1	1	3	24	5	25	6						
9	14	63	10	31*	0	0	1	1	1	1	0	21	17	9	17	23						

PLANKTON POPULATION

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN SUSQUEHANNA-JUNIATA
STATION LOCATION SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND 075

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND BREATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				ROTIFERS												CRUSTACEA										
														GENERA AND COUNT LEVEL (See text for Codes)												GENERA AND COUNT LEVEL (See text for Codes)							
														1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml)	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	INSECT LARVAE (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
10	3	62	20	65	56	4	58	4	92	3	24	-	-	0									9	50	2	77	1			2	0
10	17	62	26	32	56	20	19	12	58	7	29	-	-	55	11	3	2	1	17	1	21	1	6	50	1	51	1			0	0
11	7	62	26	16	27	16	56	12	62	8	48	-	-	75	21	3	2	3	11	2			15	51	2	50	1			0	0
11	21	62	62	11	26	9	92	9	64	6	65	-	-	0									0							0	0
12	5	62	82	22	92	12	26	9	36	5	52	-	-	0									0							0	0
12	19	62	92	33	2	11	14	6	64	4	46	-	-	0									0							0	0
1	16	63										-	-	0									0							0	0
2	6	63										10	0	0									0							0	0
3	6	63	95	37	14	30	93	9	46	3	21	-	-	0									0							0	0
3	20	63	92	47	26	21	14	8	16	2	22	-	-	0									0							0	0
4	1	63	92	13	93	12	36	8	31	5	62	-	-	0									0							0	0
4	17	63	92	35	36	5	51	5	26	4	51	-	-	0									0							0	0
5	1	63	82	49	9	12	92	10	67	10	19	-	-	-									-							-	-
5	15	63	9	53	27	12	82	9	26	9	17	-	-	-									-							-	-
6	5	63	58	59	26	6	9	4	92	3	28	-	-	-									-							-	-
6	19	63										-	-	-									-							-	-
7	3	63	82	26	27	21	56	13	58	9	31	-	-	-									-							-	-
8	5	63	19	42	47	15	56	12	26	9	22	-	-	-									-							0	0
8	19	63	70	21	18	21	26	14	91	11	33	-	-	-									-							-	-
9	4	63	82	16	2	11	19	11	26	7	55	-	-	-									-							-	-
9	18	63	19	36	82	10	26	6	58	3	45	-	-	-									-							-	-

PLANKTON POPULATION

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN SUSQUEHANNA-JUNIATA
STATION LOCATION SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND 75

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATES (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	3	62	300	10	10	20	0	0	0	190	30	40	100																		
10	17	62	500	0	60	260	0	80	20	80	30	0	20	38	1																
11	7	62	2000	50	20	570	0	230	0	810	320	360	290	68	2	38	1	77	1												
11	21	62	500	0	0	60	0	20	0	260	200	120	200																		
12	5	62	300	0	0	0	0	40	0	0	210	0	40																		
12	19	62	100	0	0	0	0	0	0	0	120	20	90																		
1	16	63	100	0	0	0	0	0	20	20	60	0	50																		
2	6	63	00	0	0	0	0	0	0	30	0	0	0																		
3	6	63	100	0	10	0	0	0	0	0	100	60	180																		
3	20	63	1600	0	40	130	0	20	20	70	1320	240	990	92	3	82	1														
4	1	63	100	0	0	0	0	0	0	0	140	20	170																		
4	17	63	900	0	0	0	0	530	60	170	150	60	230	51	2																
5	1	63	2300	20	0	180	0	620	0	1010	510	130	370	71	3	65	2	52	1	92	1										
5	15	63	800	0	0	110	0	70	0	40	570	40	150	77	2																
6	5	63	2700	0	40	590	0	310	0	550	1190	121[illegible]	3890	68	2	26	2	73	1	77	1	92	1	88	1						
6	19	63	00	0	0	20	0	0	0	0	20	20	50																		
7	3	63	700	0	0	260	0	0	0	290	130	150	0	38	1																
8	5	63	300	30	0	120	0	0	0	50	70	30	100																		
8	19	63	8600	60	2490	1040	0	20	0	1330	3660	20	270	17	5	88	4	92	3	71	3	38	2	67	2	68	1	87	1	24	1
9	4	63	400	0	0	110	0	0	0	130	130	40	110																		
9	18	63	900	0	0	20	0	110	0	320	410	270	630																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA-JUNIATA

STATION LOCATION SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND 75

DATE OF SAMPLE BEGINNING			DATE OF SAMPLE END		GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
											NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	2	62	10	11	4900	230	109	121	3	25	32	2	2	28	0	15	12	1	21
11	2	62	11	14	5356	196	67	129	3	17	23	2	2	18	1	8	5	1	10
12	11	62	12	31	2276	487	111	376	-	-	-	-	-	-	-	-	-	-	-
1	21	63	1	30	5173	216	67	149	4	16	20	2	2	16	0	7	5	1	14
2	12	63	2	21	5295	209	92	117	-	-	-	-	-	-	-	-	-	-	-
3	12	63	3	21	5236	172	71	101	2	18	24	3	3	16	2	8	6	1	12
4	19	63	4	29	5311	140	62	78	-	-	-	-	-	-	-	-	-	-	-
5	17	62	5	28	5120	165	81	84	8	21	20	2	2	16	0	7	12	2	11
6	18	63	7	1	6806	163	73	90	-	-	-	-	-	-	-	-	-	-	-
7	24	63	8	2	4961	212	84	128	8	22	21	1	1	18	1	8	8	2	15
8	21	63	9	3	5434	264	125	139	-	-	-	-	-	-	-	-	-	-	-
9	18	63	10	1	6565	167	70	97	2	19	19	1	1	16	1	10	9	1	10

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MARYLAND

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA-JUNIATA

STATION LOCATION SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND 75

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (cobalt units)	TURBIDITY (silica units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	3	62	18.9	7.3	7.3	.5	16	-	-	-	15	38	190	4	10	124	.0	308	650
10	10	62	20.6	7.6	6.8	1.0	8	-	-	-	8	28	118	8	30	88	.0	183	1000
10	17	62	18.3	8.5	7.0	.9	5	-	-	-	9	21	92	7	5	62	.0	164	130
10	24	62	16.1	8.5	7.1	1.5	2	-	-	-	11	24	103	5	5	76	.0	177	110
10	31	62	12.8	8.7	6.9	2.1	5	-	-	-	10	24	93	8	4	36	.0	122	*100
11	7	62	9.4	10.6	6.9	.9	6	-	-	-	8	24	115	6	8	93	.0	191	300
11	14	62	8.9	11.2	7.1	1.4	23	-	-	-	7	25	91	5	25	62	.0	148	-
11	21	62	7.2	11.1	7.2	1.5	-	-	-	-	5	18	69	4	4	61	.0	115	340
11	28	62	6.7	11.5	6.8	1.6	10	-	-	-	11	22	84	6	12	26	.0	139	100
12	5	62	5.6	11.9	6.8	-	4	-	-	-	10	24	76	6	10	-	.0	135	150
12	12	62	2.2	12.3	6.9	-	-	-	-	-	9	25	59	5	20	-	.0	164	9100
1	2	63	2.2	12.3	7.2	.5	13	-	-	-	10	25	70	6	20	-	.0	172	90
1	16	63	2.8	12.1	6.8	.4	17	1.2	3.8	-	9	29	79	6	5	-	.0	211	-
1	23	63	1.7	13.2	6.8	1.5	11	.4	1.0	-	8	22	58	5	5	-	.0	200	5
1	30	63	1.1	13.2	6.9	1.0	-	.7	1.5	-	10	25	71	5	4	-	.0	-	2600
2	6	63	1.7	12.5	6.8	1.5	3	-	-	-	9	29	92	8	4	65	.0	137	-
2	13	63	1.7	12.3	6.8	1.0	2	-	-	-	10	27	100	6	7	78	.0	156	11000
2	20	63	2.8	12.1	6.6	-	5	-	-	-	14	26	100	5	4	70	.0	148	1300
2	27	63	3.3	12.5	7.0	2.7	10	-	-	-	14	34	111	6	6	83	.0	161	1500
3	6	63	3.3	12.3	6.8	2.0	20	-	-	-	11	35	112	6	5	-	.0	165	770
3	13	63	3.3	13.1	6.7	3.2	27	-	-	-	10	24	64	5	10	72	.0	151	3000
3	20	63	3.9	13.0	6.8	-	22	-	-	.1	9	17	49	6	30	49	.0	131	4200
3	27	63	8.9	11.7	6.8	2.7	2	-	-	-	9	18	51	5	10	46	.0	118	3300
4	3	63	11.7	11.4	6.9	2.4	29	-	-	.1	2	15	39	6	6	-	.0	64	2800
4	10	63	12.8	10.6	6.8	-	10	-	-	.1	3	24	57	5	10	29	-	68	-
4	17	63	11.1	10.3	6.8	1.6	11	-	-	-	4	41	69	6	3	35	.1	94	500
4	24	63	15.0	9.5	6.8	1.9	9	-	-	-	5	31	93	4	4	45	.0	125	-
5	1	63	14.4	9.3	6.7	2.0	9	-	-	.2	7	34	88	6	6	43	.0	122	330
5	8	63	16.7	8.4	7.3	1.5	11	-	-	.2	6	30	83	8	4	49	.0	133	60
5	15	63	17.2	7.1	7.2	.8	-	-	-	.3	6	34	122	6	3	50	.1	122	140
5	22	63	18.3	8.4	6.9	-	19	1.3	2.7	.1	6	27	82	6	3	54	.0	110	530
5	29	63	17.8	7.8	7.0	1.7	12	1.8	3.0	.2	3	32	68	6	5	-	.0	101	-
6	5	63	19.4	7.4	6.8	-	9	.7	2.2	.2	9	35	74	6	3	55	.1	135	-
6	12	63	22.8	7.1	7.0	1.8	13	.9	3.7	.1	7	32	66	6	3	58	.0	115	-
6	19	63	22.8	5.2	6.9	1.9	10	.8	4.5	.3	10	33	80	8	3	33	.1	96	-
6	26	63	23.9	5.1	7.0	.4	29	-	-	-	11	33	90	6	2	35	.1	87	-
7	3	63	24.4	3.5	7.0	.6	27	-	-	.1	10	33	105	6	2	77	-	155	-
7	10	63	25.6	5.9	6.9	.8	38	-	-	-	11	35	102	8	2	46	-	152	100

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MARYLAND
MAJOR BASIN NORTH ATLANTIC
MINOR BASIN SUSQUEHANNA-JUNIATA
STATION LOCATION SUSQUEHANNA RIVER AT CONOWINGO, MARYLAND 75

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	17	63	26.1	3.0	7.0	.7	18	-	-	-	11	37	106	6	3	78	-	38	-
7	24	63	26.1	2.8	7.7	.9	-	-	-	-	11	37	115	8	1	73	.01	163	1600
7	31	63	26.7	1.4	7.0	.9	16	1.1	-	-	12	37	124	6	1	-	-	94	-
8	7	63	26.7	2.9	7.1	-	21	-	-	.1	12	35	119	6	4	72	-	157	-
8	14	63	26.1	4.0	7.3	3.8	15	-	-	-	14	35	136	8	5	90	.1	195	-
8	21	63	25.0	5.3	7.5	.8	14	-	-	.2	15	36	149	8	3	93	-	202	-
8	28	63	23.9	4.2	7.3	2.5	14	-	-	-	16	37	147	8	7	152	.1	331	50
9	4	63	23.3	5.3	7.2	2.6	14	-	-	.1	16	39	148	4	5	90	-	232	-
9	11	63	23.3	4.2	7.2	-	18	-	-	-	17	38	163	4	6	108	.1	258	200
9	18	63	22.2	4.0	7.3	3.2	16	-	-	-	17	37	171	4	*25	99	.0	254	150
9	25	63	20.0	6.7	7.4	2.4	14	-	-	-	19	35	183	4	*25	110	-	281	150

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Marietta, Pennsylvania
Operated by U.S. Geological Survey

STATE Maryland

MAJOR BASIN North Atlantic

MINOR BASIN Susquehanna-Juniata

STATION LOCATION Susquehanna River at Conowingo, Maryland

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	9.460	10.300	20.900	9.000	16.000	11.000	150.000	28.000	32.600	11.100	6.420	3.910
2	14.000	11.600	19.800	8.600	18.000	11.000	127.000	28.000	29.800	10.000	7.480	3.670
3	13.600	13.700	18.700	9.500	18.000	11.000	110.000	27.700	27.600	9.370	6.570	3.490
4	12.300	16.200	17.800	10.500	18.000	13.000	100.000	26.400	26.200	8.990	6.420	5.610
5	34.800	19.300	17.300	13.500	20.000	23.000	91.200	25.900	24.800	8.950	6.120	5.720
6	47.100	20.300	18.800	13.000	19.000	48.000	83.500	25.200	22.900	8.490	6.120	5.820
7	41.500	19.800	27.200	13.000	20.000	81.400	79.700	23.400	22.400	8.540	5.860	4.740
8	31.300	19.200	34.100	14.000	19.000	102.000	71.600	21.800	21.600	7.980	5.460	4.640
9	27.100	18.600	37.100	14.000	19.000	69.900	62.600	20.300	23.100	7.280	5.010	4.480
10	25.400	28.000	43.000	15.000	18.000	52.500	54.900	19.600	20.900	6.800	4.910	4.220
11	23.400	48.700	37.300	16.000	19.000	62.500	48.200	22.700	20.900	6.570	4.550	4.160
12	21.600	62.100	30.000	17.000	20.000	62.700	43.000	23.000	19.800	6.610	4.450	4.740
13	19.400	62.300	18.000	21.000	18.000	61.100	38.000	27.300	20.500	6.120	4.100	4.610
14	17.900	56.100	19.000	29.000	17.000	63.400	34.100	33.000	20.400	6.230	4.480	4.480
15	37.300	47.400	17.000	38.000	15.000	82.900	32.800	33.600	20.400	5.880	3.940	4.160
16	29.000	40.500	16.000	46.000	14.000	103.000	31.100	31.000	20.600	6.570	4.260	4.350
17	22.300	34.800	17.000	45.000	14.000	111.000	29.000	28.000	20.200	6.310	4.220	4.290
18	18.700	31.200	19.000	41.000	13.000	122.000	26.900	27.900	18.600	5.930	4.070	4.420
19	16.500	31.700	19.000	37.200	14.000	179.000	25.100	38.900	17.400	5.930	3.760	4.380
20	14.400	27.900	21.000	35.700	14.000	205.000	25.200	54.000	16.200	5.680	4.260	3.790
21	13.000	25.600	19.000	35.400	14.000	178.000	25.500	51.200	15.300	6.080	5.080	3.790
22	11.300	25.900	16.000	32.200	14.000	166.000	27.600	49.200	15.200	5.900	4.880	3.350
23	11.100	26.200	17.000	26.900	13.000	134.000	32.500	43.700	14.100	5.970	4.450	3.230
24	10.000	29.500	17.000	23.000	13.000	105.000	35.400	40.100	13.700	7.240	4.320	3.040
25	9.560	28.900	16.000	21.000	12.000	90.400	32.700	36.300	12.100	7.560	4.000	2.740
26	9.210	30.200	16.000	19.000	11.000	96.500	31.300	32.900	11.200	7.850	3.970	2.710
27	8.520	29.000	15.500	14.000	11.000	156.000	31.600	31.600	10.600	8.360	4.160	2.710
28	8.090	27.000	15.000	15.000	11.500	230.000	32.200	39.800	9.910	7.240	4.190	2.840
29	8.570	24.700	14.000	17.000		231.000	29.500	45.200	9.510	7.120	4.160	4.220
30	7.950	22.500	13.000	15.000		205.000	28.100	41.700	10.200	6.610	3.940	4.420
31	9.610		10.000	15.000		176.000		37.100		6.190	4.100	

SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA

The upper Susquehanna originates in the Catskill Mountains of the State of New York and enters Pennsylvania just upstream from the sampling station at the intake of the Sayre, Pa. municipal water treatment plant. The drainage basin upstream from the station in the State of New York comprises some 6,270 square miles.

There are a number of small New York communities a short distance upstream from the station that discharge both municipal and industrial wastes into the river. The largest upstream communities that discharge sewage treatment plant effluents into the river or tributary include Elmira, New York with a population of 46,500 located 26 miles upstream and Binghamton, N. Y., serving a population of 82,000 located 51 miles upstream.

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Station Location: Susquehanna River at Sayre, Pennsylvania

Major Basin: North Atlantic

Minor Basin: Susquehanna River

Station at: 41°59' Latitude 76°31' Longitude

Miles above mouth: 302

Activation Date: February 16, 1960

Sampled by: Sayre Water Company

Field Analysis by: Sayre Water Company

Other Cooperating Agencies: Pennsylvania State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Waverly, New York

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 4,780 square miles

Period of record: 1937 to present

Average discharge in record period: 7,549 cfs.

Maximum discharge in record period: 112,000 cfs.

Minimum discharge in record period: 247 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-5-63	0.10
3-12-63	0.09
3-18-63	0.06
3-27-63	0.05
4-1-63	0.03
4-8-63	0.03
4-15-63	0.02
4-22-63	0.02
5-20-63	0.03
5-27-63	0.04

ELEMENTAL ANALYSES

		Composite 10/1/62 to 12/31/62	Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.01	*.05
	Na	6.0	3.8
	K	2.0	.8
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	106	54
	Cd	2	*2
	As	10	*11
	B	28	70
	P	91	11
	Fe	122	9
	Mo	*1	*3
	Mn	.8	1
	Al	—	.8
	Be	*.02	*03
	Cu	5	12
	Ag	*.2	*.3
	Ni	*1	*2
	Co	*2	*2
	Pb	7	3
	Cr	1	3
	V	*1	13
	Ba	26	19
	Sr	42	29

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.0	.1	April to June	—	—
January to March	—	—	July to September	2.3	.3

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA RIVER-NORTH BRANCH

STATION LOCATION SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA 76

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA						BETA							DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	10	23	-	-	-	-	-	-	7	5	34	8	41	9						
10	8	62	11	9	-	-	-	-	-	-	6	7	15	7	21	10						
10	15	62	11	9	-	-	-	-	-	-	23	12	20	7	43	14						
10	22	62	11	20	0	0	0	0	0	0	7	5	35	8	42	9						
10	29	62	11	21	-	-	-	-	-	-	4	6	16	7	20	9						
11	26	62	12	15*	0	0	0	1	0	1	24	5	20	5	44	7						
12	31	62	1	15*	0	0	0	0	0	0	0	9	7	7	7	11						
1	28	63	2	21*	0	1	0	1	0	1	6	6	15	7	21	9						
2	26	63	4	4*	0	0	0	1	0	1	7	6	12	7	19	10						
3	25	63	4	16*	1	1	0	1	1	1	45	8	23	7	68	11						
4	29	63	5	24*	0	1	0	0	0	1	13	7	15	6	28	9						
5	27	63	6	24*	0	1	0	0	0	1	14	3	14	3	28	4						
6	24	63	7	30*	0	0	1	0	1	0	8	6	17	6	25	8						
7	29	63	8	23*	0	0	0	0	0	0	10	6	31	8	41	10						
8	19	63	10	14*	0	1	0	1	0	1	7	3	25	4	32	5						
9	30	63	11	6*	0	1	0	1	0	1	6	6	12	7	18	9						

PLANKTON POPULATION

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA RIVER-NORTH BRANCH

STATION LOCATION SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA

76

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	84000	80	210	1690	0	0	0	80390	1690	3000	2740	71	9	68	8	38	3	82	2	87	2	79	1	88	1	17	1	26	1	40	1
10	15	62	1100	20	40	110	10	0	0	450	420	110	130	68	2																		
11	5	62	1100	0	0	40	0	40	0	170	870	170	80																				
11	19	62	1100	0	0	40	0	0	60	210	750	40	40	82	1	92	1																
12	3	62	200	0	0	0	0	0	0	30	150	0	80																				
12	17	62	200	0	0	0	0	40	0	0	120	0	0																				
1	7	63	300	0	0	0	0	0	0	0	290	20	180																				
1	21	63	300	0	0	0	0	0	0	20	320	20	130																				
2	4	63	300	0	0	0	0	0	0	150	170	20	20																				
2	18	63	700	0	40	0	0	0	40	0	600	20	20	92	1	85	1																
2	20	63	100	0	0	0	0	0	0	0	60	0	20																				
3	5	63	900	0	0	0	0	20	0	20	820	20	320	92	2																		
3	18	63	2100	0	0	40	0	0	0	90	2000	70	1410	92	3	82	3	87	1														
4	1	63	200	0	0	0	0	40	0	0	200	20	200																				
4	15	63	300	0	0	0	0	0	20	40	240	40	370																				
5	6	63	8800	0	0	40	0	150	0	7300	1300	20	660	71	6	92	2	85	1	81	1												
5	20	63	1800	0	0	20	0	40	0	350	1430	0	950	92	3	71	1	81	1	87	1												
6	3	63	14700	0	40	150	0	290	0	13200	1030	640	1390	68	7	81	2	92	1	88	1	51	1										
6	17	63	22500	70	480	1010	0	90	40	19410	1470	640	330	71	6	68	6	17	2	87	2	92	2	26	2	38	1	88	1	82	1		
7	1	63	14300	0	20	12650	0	290	0	790	560	750	390	24	6	25	5	34	4	38	4	71	3	51	1	79	1	44	1				
7	15	63	11700	20	0	5240	0	100	20	5920	410	870	150	71	6	34	4	24	4	26	3	68	3	38	3	25	2	88	1				
8	5	63	20500	20	0	14490	0	350	20	3640	1930	1100	560	38	6	34	5	68	5	25	4	71	4	88	4	35	2	51	2	79	2	29	2
8	19	63	21000	80	0	14510	0	370	40	5610	410	1120	250	45	6	71	5	29	5	38	4	24	4	34	3	68	3	31	2	25	2	51	1
9	16	63	9000	380	0	5990	0	1170	0	1190	140	410	160	24	4	38	3	51	3	34	2	25	2	3	2	44	2	31	2	29	1	45	1

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA RIVER-NORTH BRANCH

STATION LOCATION SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA 76

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES										
BEGINNING			END								NEUTRALS								
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLOROFORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGENATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	13	4187	223	64	159	1	12	28	2	2	24	0	8	4	1	10
11	6	62	11	16	3297	234	70	164	2	20	21	3	2	16	0	8	6	1	12
12	3	62	12	18	4199	258	56	202	2	16	19	2	2	15	0	7	4	1	7
1	7	63	1	17	3582	211	58	153	-	-	-	-	-	-	-	-	-	-	-
2	4	63	2	18	4341	208	82	126	4	22	25	1	1	22	1	9	9	1	12
3	5	63	3	18	1776#	484	148	336	-	-	-	-	-	-	-	-	-	-	-
4	2	63	4	16	2238	231	69	162	4	18	19	3	2	14	0	7	6	1	14
5	6	63	5	16	2772	178	41	137	-	-	-	-	-	-	-	-	-	-	-
6	5	63	6	14	3528	176	73	103	3	20	25	3	2	19	1	9	6	1	9
7	3	63	7	12	3210	234	98	136	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	13	3228	227	95	132	7	23	28	1	1	23	3	9	8	2	18
9	3	63	9	13	3491#	154	81	73	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA RIVER-NORTH BRANCH

STATION LOCATION SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA 76

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	13.9	-	8.1	-	-	-	-	-	-	92	110	5	20	-	-	-	*50
10	8	62	13.8	-	8.1	-	-	-	-	-	-	46	60	10	30	-	-	-	5500
10	15	62	13.1	-	7.8	-	-	-	-	-	-	33	46	10	50	-	-	-	750
10	22	62	13.1	-	7.8	-	-	-	-	-	-	56	84	5	20	-	-	-	400
10	29	62	8.5	-	8.3	-	-	-	-	-	-	62	96	5	15	-	-	-	*50
11	5	62	6.4	-	7.8	-	-	-	-	-	-	50	74	5	15	-	-	-	*50
11	12	62	6.6	-	7.4	-	-	-	-	-	-	28	52	10	35	-	-	-	340
11	19	62	4.2	-	7.4	-	-	-	-	-	-	43	68	5	10	-	-	-	8200
11	26	62	3.9	-	7.6	-	-	-	-	-	-	37	56	5	15	-	-	-	3200
12	3	62	2.4	-	7.3	-	-	-	-	-	-	48	80	5	15	-	-	-	3000
12	10	62	1.1	-	7.6	-	-	-	-	-	-	33	58	5	25	-	-	-	*11
12	17	62	.9	-	7.6	-	-	-	-	-	-	57	82	10	10	-	-	-	4700
12	24	62	1.2	-	7.8	-	-	-	-	-	-	61	94	5	15	-	-	-	1800
12	31	62	1.0	-	7.9	-	-	-	-	-	-	66	104	5	10	-	-	-	1100
1	7	63	11.0	-	7.8	-	-	-	-	-	-	62	100	5	10	-	-	-	800
1	14	63	.6	-	7.6	-	-	-	-	-	-	41	62	5	35	-	-	-	7200
1	21	63	.7	-	7.8	-	-	-	-	-	-	46	68	5	10	-	-	-	4200
1	28	63	.6	-	7.9	-	-	-	-	-	-	47	80	5	10	-	-	-	270
2	4	63	.6	-	7.5	-	-	-	-	-	-	52	78	5	10	-	-	-	11000
2	11	63	.4	-	7.4	-	-	-	-	-	-	50	72	5	10	-	-	-	1400
2	18	63	.7	-	7.6	-	-	-	-	-	-	53	90	5	5	-	-	-	1100
2	25	63	.6	-	7.5	-	-	-	-	-	-	64	94	5	10	-	-	-	-
2	26	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	260
3	4	63	.3	-	7.5	-	-	-	-	-	-	67	100	-	10	-	-	-	-
3	12	63	.6	-	7.7	-	-	-	-	-	-	49	82	-	20	-	-	-	-
3	18	63	.6	-	7.6	-	-	-	-	-	-	26	42	-	230	-	-	-	-
3	25	63	2.4	-	7.8	-	-	-	-	-	-	31	44	5	50	-	-	-	6400
4	1	63	4.9	-	7.3	-	-	-	-	-	-	24	44	5	40	-	-	-	10000
4	8	63	5.8	-	7.8	-	-	-	-	-	-	29	58	5	20	-	-	-	11000
4	15	63	6.8	-	7.7	-	-	-	-	-	-	52	74	5	15	-	-	-	1600
4	22	63	9.8	-	7.8	-	-	-	-	-	-	45	64	5	15	-	-	-	8000
4	29	63	9.0	-	7.7	-	-	-	-	-	-	50	72	5	10	-	-	-	4300
5	6	63	11.8	-	8.2	-	-	-	-	-	-	60	82	5	10	-	-	-	2600
5	13	63	11.6	-	7.8	-	-	-	-	-	-	41	58	5	15	-	-	-	-
5	20	63	14.4	-	7.7	-	-	-	-	-	-	48	64	5	15	-	-	-	-
5	27	63	13.0	-	7.8	-	-	-	-	-	-	48	72	5	25	-	-	-	3000
6	3	63	17.8	-	7.9	-	-	-	-	-	-	60	76	5	15	-	-	-	1500
6	10	63	20.0	-	7.9	-	-	-	-	-	-	69	88	0	15	-	-	-	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE PENNSYLVANIA

MAJOR BASIN NORTH ATLANTIC

MINOR BASIN SUSQUEHANNA RIVER-NORTH BRANCH

STATION LOCATION SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (units)	TURBIDITY (units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	17	63	16.2	-	8.1	-	-	-	-	-	-	59	80	5	40	-	-	-	1600
6	24	63	18.1	-	8.2	-	-	-	-	-	-	71	90	5	25	-	-	-	5500
7	1	63	23.7	-	7.8	-	-	-	-	-	-	83	110	5	20	-	-	-	100
7	8	63	19.9	-	8.5	-	-	-	-	-	-	91	112	5	15	-	-	-	200
7	15	63	20.2	-	8.8	-	-	-	-	-	-	84	110	5	15	-	-	-	100
7	22	63	22.1	6.0	7.6	-	-	-	-	-	14	80	116	5	*25	20	.3	139	*40
7	29	63	25.1	6.8	8.3	-	-	-	-	-	15	74	90	0	*25	23	.2	120	-
8	5	63	22.1	7.5	8.5	-	-	-	-	-	18	84	104	5	*25	25	.2	155	-
8	12	63	22.0	7.6	8.3	-	-	-	-	-	16	82	100	5	*25	22	.1	147	3500
8	19	63	18.9	8.6	9.0	-	-	-	-	-	20	88	112	5	*25	25	.2	165	100
8	26	63	19.8	8.8	8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	2	63	17.1	8.5	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	9	63	-	-	-	-	-	-	-	-	16	88	104	10	*25	23	.1	151	100
9	16	63	-	-	-	-	-	-	-	-	15	90	108	5	*25	23	.3	159	4000
9	23	63	14.6	9.6	8.5	-	-	-	-	-	18	94	108	5	*25	25	.4	163	7000
9	30	63	15.1	7.6	7.9	-	-	-	-	-	17	94	110	5	*25	24	.4	162	4000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Waverly, New York
Operated by U.S. Geological Survey

STATE Pennsylvania

MAJOR BASIN North Atlantic

MINOR BASIN Susquehanna River- North Branch

STATION LOCATION Susquehanna River at Sayre, Pennsylvania

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1.320	4.330	4.500	2.450	3.000	1.850	41.300	7.240	5.910	1.770	.740	.716
2	1.070	4.680	4.280	2.600	3.100	1.800	39.600	8.400	5.000	1.660	.958	.740
3	.917	4.500	4.030	2.800	3.300	1.800	37.300	8.330	4.220	1.450	1.100	.776
4	.904	4.200	3.800	2.900	3.400	1.800	36.100	7.070	3.750	1.400	.930	.764
5	2.220	4.060	3.670	2.800	3.700	1.950	36.400	6.240	3.420	1.320	.839	.776
6	5.590	4.360	4.090	2.700	4.100	2.300	31.900	5.720	3.210	1.430	.891	.704
7	6.600	4.530	9.790	2.600	4.000	2.600	25.800	5.310	3.140	1.360	.930	.658
8	6.100	4.790	12.400	2.450	3.800	3.500	21.000	4.850	3.520	1.680	1.250	.636
9	5.210	6.330	11.000	2.500	3.600	3.600	17.800	4.530	3.370	2.080	1.200	.603
10	4.450	9.310	9.350	2.600	3.200	3.500	14.700	5.940	3.300	1.710	1.080	.570
11	4.330	13.600	7.940	3.200	3.000	3.500	12.100	11.000	3.230	1.530	.930	.500
12	28.300	14.400	6.400	4.200	2.800	3.500	12.800	13.000	4.220	1.390	.852	.510
13	17.200	12.900	4.970	7.600	2.700	4.900	12.500	11.800	4.680	1.250	.800	.520
14	10.100	10.300	4.470	11.500	2.600	7.400	11.400	10.100	4.730	1.160	.764	.510
15	7.580	8.650	4.300	10.400	2.500	9.000	9.870	9.350	4.970	1.070	.728	.500
16	5.750	7.580	4.140	7.800	2.300	10.000	8.610	8.790	4.910	1.040	.704	.530
17	4.650	6.370	4.600	6.600	2.350	16.000	8.580	7.830	5.180	.986	.716	.540
18	3.950	5.810	4.500	6.000	2.300	28.600	8.290	7.930	4.910	.930	.716	.540
19	3.470	5.430	4.600	5.600	2.350	26.000	8.720	11.000	4.010	.930	.865	.510
20	3.090	4.850	4.830	5.400	2.300	28.100	10.200	10.100	3.370	1.130	1.080	.470
21	2.700	4.500	4.200	6.200	2.250	24.000	12.200	10.800	3.020	1.620	1.570	.461
22	2.420	5.310	3.620	6.200	2.150	18.500	11.300	10.100	3.120	1.810	1.460	.480
23	2.270	8.400	3.280	6.000	2.100	15.500	9.900	8.830	3.230	1.660	1.280	.490
24	2.120	9.050	3.770	3.500	2.050	15.600	10.500	7.480	2.910	1.590	1.280	.470
25	2.060	8.360	3.620	3.500	2.100	23.700	11.700	6.430	2.460	1.320	1.130	.461
26	1.960	6.900	3.420	3.700	2.000	40.800	10.900	8.470	2.160	1.160	.958	.461
27	1.860	6.170	3.250	3.300	1.950	67.700	9.570	9.310	1.920	1.040	.865	.452
28	1.770	5.430	3.230	3.200	1.900	70.800	8.470	7.580	1.790	.930	.813	.470
29	1.770	4.970	3.000	3.100		64.100	7.620	6.200	1.810	.839	.800	.500
30	1.790	4.590	2.440	3.100		53.400	6.970	6.470	1.860	.826	.740	.540
31	2.350		2.500	3.000		45.200		6.600		.788	.716	

U. S. GOVERNMENT PRINTING OFFICE : 1964 O - 736 - 493